

COMPUTERWORLD

Unisys/Medicaid pact facing poor prognosis

BY ELLIS BOOKER
CW STAFF

BOSTON — Unisys Corp. is struggling to save a five-year, \$56 million contract with the Massachusetts Department of Public Welfare to process the state's Medicaid claim forms, *Computerworld* has learned.

Starting today, the commonwealth's welfare department will commence a quick review of a Unisys subsidiary's response to alleged shortcomings on the job, including one project that is a year and a half late.

The subsidiary, Paramax Systems Corp. — formerly Unisys' Defense Systems unit — won the current contract in 1989. The project was originally awarded in 1983 to a Burroughs Corp. unit. Burroughs and Sperry Corp. merged in 1986 to form Unisys.

However, Unisys, which was given just 14 days, ending today, to fix several major complaints,

may have little hope of retaining the Massachusetts contract. Electronic Data Systems Corp., by far the nation's biggest processor of Medicaid claims, is negotiating to take over the contract, according to sources.

Making its move

EDS' State Operations Division in Herndon, Va., has had "serious discussions with the department," a spokesman confirmed last week.

The EDS unit currently has contracts with 16 states and handled a total of 265 million Medicaid claims last year. That volume included California's system, the largest in the country,

Continued on page 117

Netware to get centralized view

Novell rollout will include distributed systems management features

BY ELISABETH HORWITT
CW STAFF

BURLINGTON, Mass. — After hinting for more than a year that a friendlier and more functional Netware network management offering was in the works, Novell, Inc. began talking time frames and details last week.

The new system promises to give users what they have been requesting for years: the ability to manage resources and troubleshoot their distributed Netware servers centrally and to pinpoint and deal with potential problems before they become serious.

Users can expect to see the first piece within 90 days, Novell officials told attendees at last

week's meeting of the Greater Boston-area Novell Users Group.

In fact, Novell plans to make a major announcement tomorrow, half of which will address network management, a company spokesman said. He would not comment on details.

Novell's systems management is coming none too soon for many users. Lack of an adequate Netware systems management product from Novell has forced Consolidated Insurance Group, Inc. to cobble together its own system

with the help of third parties, according to Edward Ackerman, local-area network manager at the Wilmington, Del.-based company.

Ensuring reliable LAN operations is a must for Consolidated, which retired all of its corporate IBM mainframes and replaced them with Novell LANs about two years ago.

Even Novell acknowledged that its current management products are lacking. "Right now, Netware management gives a snapshot view" that

Continued on page 115



Will new IBM alter SAA blueprints?

BY JOHANNA AMBROSIO
CW STAFF

ARMONK, N.Y. — IBM's reorganization will inevitably change the way the company approaches and delivers its large software initiatives, including Systems Application Architecture, users and analysts agree.

Beyond that, opinion is divided over whether the "new" IBM, consisting of independent business units, will mortally wound or inject renewed vigor into a host of grandiose architectures tied to SAA, including AD/



IBM's SAA czar Wheeler is two years from retirement

Cycle and Officevision, on which IBM has based much of its enterprise computing strategy during the past five years.

Calling it quits?

One large unknown is the fate of Programming Systems — the line of business headed by Earl Wheeler — which has responsibility for SAA, AD/Cycle and other large, complex software systems. In its reorganization thus far, IBM has not addressed Programming Systems or any of its other software development units.

Observers claimed Wheeler is considering early retirement, speculating that IBM would replace him with a marketing executive. "Wheeler was the czar of SAA, and revolutions kill czars," said Shaku Atre, president of Atre/Intec, Inc. in Rye, N.Y. An IBM spokesman would not comment on the reports, saying only that the 58-year-old Wheeler is due to retire by the end of 1993.

Mark Elliott, assistant general manager of marketing at Programming Systems, said IBM remains "unequivocally committed" to SAA and its other architectures. He said the structure of Programming Systems

Continued on page 116

How reasonable are your image-processing costs?

Users give their image-processing packages fairly low scores for providing reasonable purchase prices and implementation costs. Thirty users were surveyed separately for each product.

See Buyers' Scorecard page 84

Product	Score*
Highest possible score: 100	
Wang's WIIS	74
IBM's Imageplus	62
Filenet's Workflow	60

CW Chart: Janell Genovese

If pilot flies, Delta could take off with OS/2

BY ROSEMARY HAMILTON
CW STAFF

ATLANTA — Delta Air Lines may license thousands more copies of IBM's OS/2 if the operating system performs well in two major projects, according to an information systems executive at the airline.

Last month, the airline selected OS/2 for new reservation software that will replace dumb terminals installed in reservation offices today, said John King, Delta's vice president of communications and information services. Delta began working with OS/2 in 1990 to develop software for airport traffic manage-

ment, King said.

If OS/2 is successful here, it will be an enormous boost for IBM, which has been plagued by credibility problems with its strategic desktop operating system. Delta could license up to 15,000 copies of the software, according to sources, which would make it one of the largest OS/2 contracts ever won by IBM.

"If Delta buys into OS/2, that's a major feather in IBM's cap," said Tim Bajarin, executive vice president at Creative Strategies Research International, Inc. in Santa Clara, Calif.

"If Delta believes [in OS/2], then

Ready when IBM is

- IS budget: \$189 million
- Total PCs, terminals: 35,786
- Employee/PC and terminal ratio: 2:1



Source: Computerworld Premier 100 estimates

INSIDE

Computerworld's IS chief Linda Nelson will oversee the publication's migration to open systems. Page 18.



IBM will enhance its peer-to-peer protocol for distributed LANs. Page 4.

Product Spotlight —

Warning: Not all imaging systems work for a broad range of applications. Page 81.

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NOLAN BUSHNELL
OCTUS

On the need for PC innovation.
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EXECUTIVE BRIEFING

■ Will IBM's sweeping reorganization mean the dustbin for earlier Big Blue software SAA initiatives such as AD/Cycle and Officevision? IBM pledged commitment to SAA, but users and analysts question the fate of other grand architectures. **Page 1.**

■ Corporate strategic planning and systems development are usually separate bailiwicks — to the detriment of both IS and the firm it serves. 'Strategic systems development' may change all that. Using information engineering techniques, IS creates data and process models based on the business plans set by management. The result: quality, business-targeted systems that adapt readily to organizational changes. **Page 91.**

■ Delta Air Lines is expanding its commitment to IBM's OS/2. If the operating system flies in two major Delta projects, the airline may license several thousand more copies. **Page 1.**

■ \$100 billion — no, it's not the national deficit; it's the amount of money the U.S. will spend in 1991 on processing paper documents, says market research firm IDC/Avante Technologies. **Page 81.**

■ Beleaguered Unisys, under review for underperformance, is in danger of losing its \$56 million Massachusetts Department of Public Welfare Medicaid processing contract to EDS. **Page 1.**

■ Lotus will have its long-awaited 1-2-3 spreadsheet for the Apple Macintosh on store shelves by year's end, the firm says. **Page 8.**

■ Computer viruses are proliferating so rapidly that many users have given up trying to prevent them, judging by sales of antiviral software. Keeping up with new strains appears to be more trouble than dealing with isolated problems. **Page 49.**

■ The pocket modems market is gaining steam as more users opt to take their work on the road with them. **Page 110.**

■ DEC's new technology looks great, but can a company with a poor marketing reputation sell it? **Page 31.**

■ Yes, Virginia, there is a new and improved Netware — and Novell is talking time frames and details. Within 90 days, users will see the first piece of the new system,

which promises central resource management capability and the means to spot and forestall problems on distributed networks. **Page 1.**

■ Bug-fix releases of PC Tools haven't convinced some users that all the software's problems have been solved. A few sites are still reluctant to install the new version on large numbers of PCs. **Page 45.**

■ ISDN is getting another look because of the flexibility its signaling D channel offers compared with other configurable wide-area communications options. **Page 63.**

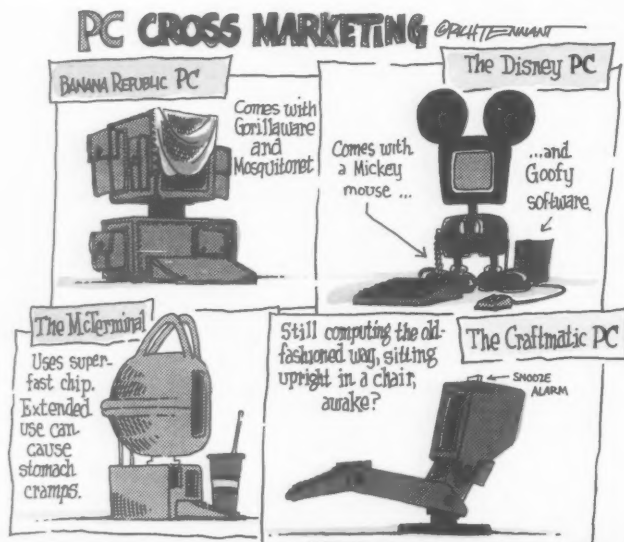
■ IS managers don't seem to object to the increase in moonlighting during the nation's economic strain — as long as their staff members get prior approval for side jobs. **Page 101.**

■ Groupware's appeal is being muted by a lack of standards and definitions. Users and vendors still disagree over what groupware is. And incompatible network and E-mail standards are making implementing it devilishly difficult. **Page 68.**

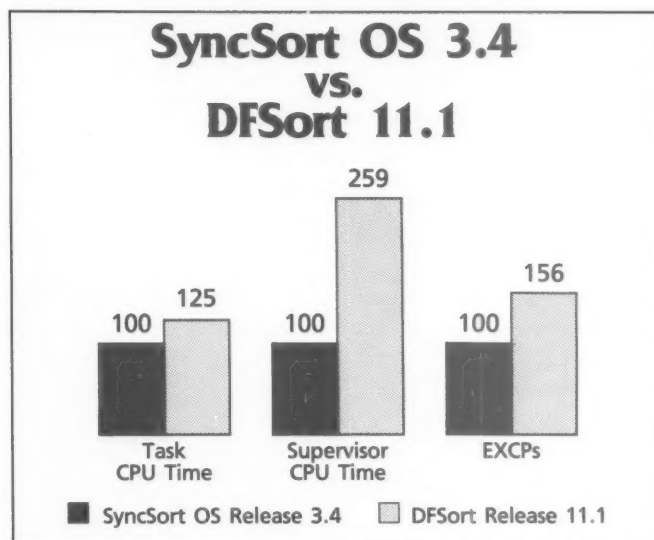
■ Oops, I forgot to take out the garbage: Object-oriented programming creates a lot of useless data, and the emerging industry is still debating how — or whether — to clean it up. **Page 29.**

■ On site this week: Puget Power's communications worked just fine except for the occasional volcanic eruption. Dynamic rerouting has the utility dreaming of 100% uptime. **Page 63.** An Arizona utility said only OS/2 has the oomph to allow it to automate its employee identification. **Page 45.**

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APPN fuels IBM networking

Company wants protocol to be part of users' LAN migration plans

BY ELISABETH HORWITT
CW STAFF

ARMONK, N.Y. — A more mature and functional Advanced Peer-to-Peer Network (APPN) will be the driving force of IBM's campaign next year to keep users from abandoning Systems Network Architecture (SNA) as they migrate to distributed local-area network systems.

Despite a three-year lag in fulfilling promises to make APPN the basis of its peer-to-peer SNA strategy, "An awful lot of IBM's future is riding on future acceptance of APPN by the industry," said David Passmore, a partner at Ernst & Young.

While IBM may succeed in selling its APPN strategy as an easier way to manage SNA installations, it is proving tougher to get users to adopt peer-to-peer SNA as their primary LAN connectivity protocol.

Next year, IBM spokesmen said, the vendor will finally introduce APPN support for mainframes, front ends and 3270 applications — gaps that have discouraged many SNA users from migrating to the protocol.

To date, APPN runs only on IBM Application System/400s and OS/2 platforms and requires

the use of IBM's LU6.2, which still makes up a minuscule percentage of total SNA installations, Passmore said.

Breaking down barriers

Next year, IBM will eliminate two long-standing barriers to LU6.2 adoption, by introducing a less memory-intensive LU6.2 version for DOS and LU6.2 support for Microsoft Corp.'s Windows 3.0, said Rick McGee, manager of IBM's communications systems architecture.

Making APPN available to traditional 3270 users represents IBM's best chance of selling its full APPN/LU6.2 strategy to its customers, Passmore said. APPN removes much of the manual grunt work needed to maintain large 3270 installations by automatically defining and maintaining directories of applications, users and files.

Another key APPN benefit is the ability to dynamically set up connections between client and host across a multinode network — for example, across multiple interconnected LANs. Unfortunately, IBM's initial APPN release for IBM front ends and hosts will still require direct host-to-3270 connections, McGee said.

The Travelers Corp. is eyeing APPN as a way to make its huge 3270 network more routable and easier to manage, according to Robin Layland, manager of SNA software engineering. "Right now, our routers have to encapsulate [SNA] and play tricks" in order to route traditional 3270 applications, he said.

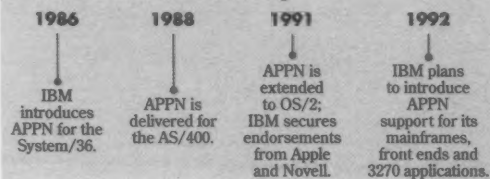
Banc One Services Corp. has been eagerly awaiting mainframe and front-end versions of APPN as a necessary transitional step to a "pure LU6.2 network," said Terry Lowder, vice president of the advanced technology group at the Banc One Corp. information systems subsidiary. The bank has found that LU6.2-based connections provide better throughput than 3270-based connections and allow client systems to switch easily across multiple hosts for database access, he added.

APPN would allow users on various LANs to exchange messages whenever they like, without having to predefine the connection, according to Lowder.

Right now, the bank's communications group must set up tables on the SNA front end to handle any new requests for LAN-to-LAN connections — a process that could take six

Seeking peers

IBM's Advanced Peer-to-Peer Networking



CW Chart: Michael Siggins

weeks, he added. "By then, you could walk the data across."

CSX Corp. is considering APPN as "overall coordinator" of a planned corporatewide, multivendor, peer-to-peer network, now in the planning stages, said Doug Underhill, an assistant vice president at the transport firm. CSX plans to use LU6.2 to support program-to-program communications among a variety of devices, including IBM mainframes and System/88s, Digital Equipment Corp. VAXs and Apple Computer, Inc. Macintoshes, Underhill said.

Slow start

One problem IBM faces is that companies such as Travelers and CSX are still in the minority.

And even serious LU6.2 implementors are balking at making APPN and LU6.2 their primary LAN communications system. Travelers, for example, views LU6.2 as just another useful protocol, along with Netbios

and Novell, Inc.'s IPX, that its routers will handle, Layland said.

Furthermore, popular routers will not even be able to handle APPN traffic until IBM publishes the APPN Network Node protocol — a move many sources said they believe is in the offing.

IBM is preparing to capture the LAN interconnectivity market with a now-embryonic product called APPN+, McGee said. Unlike today's popular LAN protocols, APPN+ is being built from scratch to take advantage of the higher bandwidth provided by fast-packet networks, McGee said. Furthermore, APPN+ will be able to route other popular protocols such as IPX, he added.

The question is whether users will hold off on their LAN strategies or reorient them when APPN+ does arrive. McGee promised that pieces of the protocol will begin to appear within two years.

Cummins plans EDI link to leap Atlantic

BY CLINTON WILDER
CW STAFF

SAN DIEGO — The web of paperwork involved in importing goods can keep cargo languishing on docks for weeks, but Cummins Engine Co. says it can untangle the web with electronic data interchange (EDI).

Cummins is about to kick off a pilot EDI plan linking a British Cummins factory with the U.S. Customs Service, Cummins' customs broker and Cummins headquarters in Columbus, Ind. A Cummins executive presented the plan at the 23rd annual Electronic Data Interchange Association (EDIA) conference here last week.

"We have been moving the material faster than we move the paperwork," said Fran Warren, manager of EDI in the management systems department at Cummins.

Cummins is one of many companies doing or planning to do customs paperwork electronical-

ly. Using EDI dramatically improves accuracy, said William Riley, assistant commissioner at the Customs Service's Office of Information Management. He said the service rejects one of every six paper documents; with EDI, the rejection rate is only one in 52.

In Cummins' pilot program, data will adhere to the international Edifact standard. When Cummins' high-horsepower engine plant in Daventry, England, is ready to ship products to the U.S., it will transmit invoices and shipping notices to Cummins in Indiana.

A second ship notice will also go to Cummins' shipping firm. Cummins will then transmit the invoice to its customs broker, formerly done via fax.

"We want to eliminate the systems that take up people's time," Warren said.

As the final link in the EDI delivery chain, the customs broker will exchange electronic customs declarations and customs

resolution documents with the Customs Service.

Warren said Cummins faced very few technical or standards barriers in planning the pilot. "Our [EDI] translators found a spot for every data element in Edifact," he said. "It hasn't been

any emotional thing with our partners, just a lot of grunt work."

The psychological barrier of resistance to change could be another matter, however. "We have clerks who have been dealing with the paper for 25 years,"

Warren said. "It's easy to put the new process in place, but sometimes harder to get people to stop doing things the old way."

If the pilot is successful, Cummins plans to forge EDI links with the British customs services for imports into the UK.

Impasse in quest for standard E-mail API

BY JOANIE M. WEXLER
CW STAFF

REDMOND, Wash. — Last week's meeting of the X.400 API Association broke little ground toward a compromise on a standard application programming interface (API) for electronic mail-enabled programs.

Presentations from Lotus Development Corp., Microsoft Corp. and Novell, Inc. on their respective industry-standard API candidates led to conflicting statements from the association's Chairman Ed Owens, who is also director of work-group and connectivity software at Lotus' CC:Mail division. "There is no conflict between the different APIs, though there is some overlap. There is room for several industry APIs, although an application developer would likely want to choose one," he said.

Owens said the group did decide to create a single, simple

"send" function that will run over all the API hopefuls. However, the group was unable to give a target time frame.

The issue of E-mail APIs has users such as Peter Donaghy, laboratory manager of customer services and support at Hughes Aircraft Co. in Long Beach, Calif., "very, very concerned. My take on it right now is that users are the losers."

Donaghy explained that Lotus' Open Messaging Interface and Microsoft's Application Programming Interface — both fledgling specifications — will eventually compete with XAPI, the interface that hooks applications to an Open Systems Interconnect X.400 mail engine.

"There is no standard API anymore," he said. "One of our frustrations is we're waiting to start writing LAN clients for our E-mail systems. Which API do we write to?"

Mail-enabled applications,

such as Lotus' Notes groupware program, bundle messaging capabilities with programs. The API interfaces the application to a mail engine, such as X.400, Novell's Message Handling System (MHS) and CC:Mail. Until each API hooks to every E-mail engine, "users will have to manage multiple E-mail servers on each LAN" if they mix and match the various vendors' applications programs, said David Knight, director of market development at X.400 pioneering firm Retix.

The Standard Message Format, the API to MHS has been adopted by over 100 applications and has more than 700 registered developers working on it, according to Carey Heckman, director of messaging products marketing at Novell.

Steve King, Lotus' director of communications products, said Lotus "is involved in active discussions with a variety of participants" to resolve the API issue.



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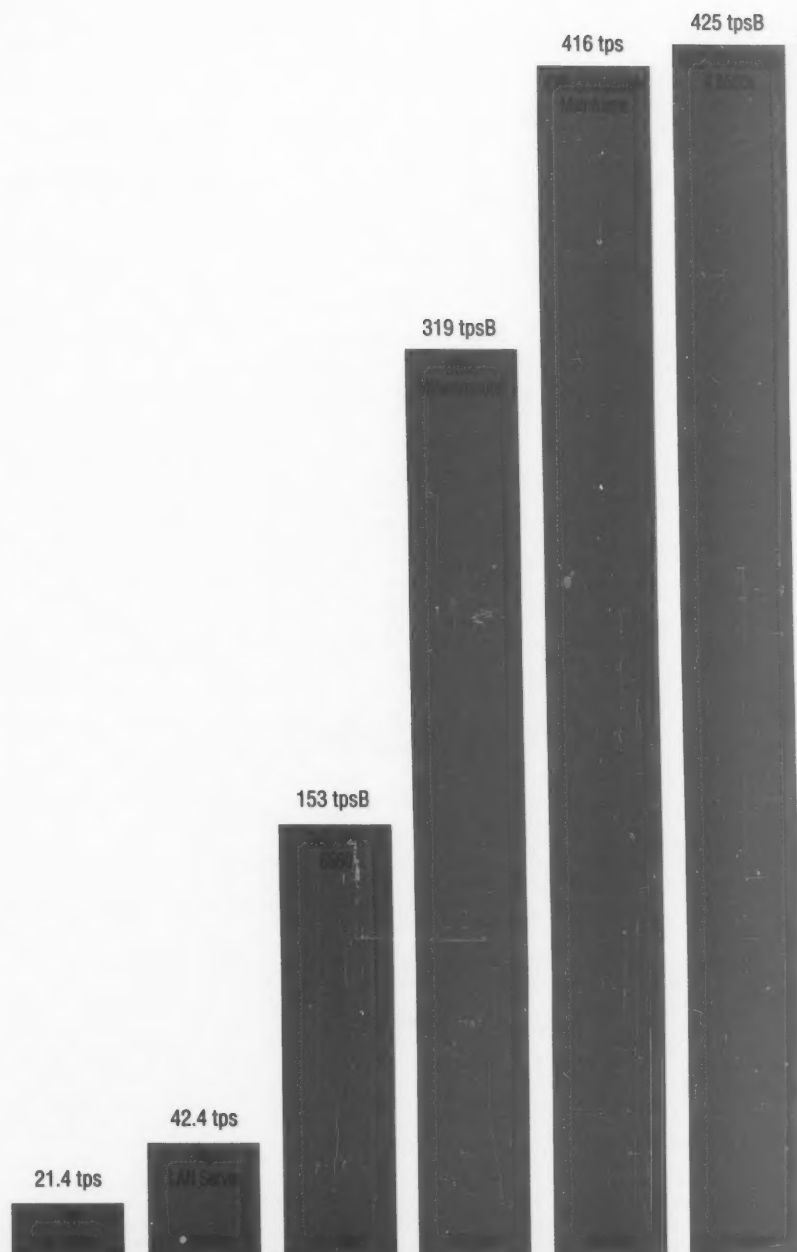
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Only the innovative to survive PC future

BY JAMES DALY
CW STAFF

BURLINGAME, Calif. — The personal computer industry that bloomed vigorously throughout the 1980s has begun to wilt and may be nearly dead as we know it by the mid-1990s, according to participants at a gathering of high-level industry executives held last week.

"The PC [will become] part of a much larger interactive information industry, and it will be a very tough place to be for those who can't innovate," Apple Computer, Inc. Chairman John Sculley said, while speaking at the two-day Personal Computer Outlook conference.

The days when a computer company could monolithically de-

vote itself to one box serving one need are gone, hastened by a PC industry that grew only 4% last year, according to Dataquest, Inc.

Although the recession was cited as one cause for the slowdown, the greater problem is a lack of innovation that has left most PC makers peddling machines that have little to differentiate them, Sculley said. The result is the commoditization of the PC, with an accompanying drop in prices, plummeting profits and layoffs.



Apple's Sculley: Tough times ahead for those who don't branch out

Additionally, many Fortune 1,000 firms have reached the saturation point on PC integration, forcing hardware vendors to look elsewhere for new business — major vendors such as IBM and Dell Computer Corp. are already working on machines using pen-input technology.

The successful companies will be the ones that branch into such areas as communications, consumer electronics and interactive technologies, including shopping, banking at

home and instant call-up movie rental. "We can still be successful, but with a different complexion," said Safi Qureshy, president of AST Research, Inc. "The challenge is to remain flexible."

The shakeup could be good news for end users, however. Aggressive price-cutting is expected in all sectors. Increasing technological alliances will make cross-platform interoperability easier while ongoing distribution channel wars will make PC purchasing easier. Vendors will battle furiously to best their competitors at customer support.

Experts argue, however, about the best ways to reinvent the industry. "The PC needs to once again become compelling," said William Hawkin, chairman of Electronic Arts

in San Mateo, Calif.

Some observers have pinned their hopes on multimedia, which integrates sound, video and animation. Other proposals include plans for pen-based systems or wireless computing within the next year. Multimedia could lead to the creation of new applications in virgin areas such as videoconferencing, store-and-forward video mail, low-cost video editing and compact disc/read-only memory magazines.

However, outside of training and support, multimedia is often characterized as a technology in search of a business application.

"Today's [multimedia] hardware is expensive, underpowered, unreliable and does not do a good job," said Nolan Bushnell, chairman of Octus, an office equipment vendor and inventor of the original "Pong" video game. "So how do you make a cow dance?"

Solbourne targets Sun with systems price cuts

BY MARYFRAN JOHNSON
CW STAFF

LONGMONT, Colo. — Solbourne Computer, Inc. slashed prices by up to 50% last week on its low-end Unix workstations and servers, joining the roster of companies gunning for Sun Microsystems, Inc. in that highly competitive space.

Considered Sun's most tenacious competitor in the high-end server segment of the Scalable Processor Architecture (Sparc) market, Solbourne's 4,500 installations are dominated by servers offering symmetrical multiprocessing capabilities still unavailable from Sun.

Yet despite the difficulty of turning a profit in the lowest margin commodity segment of the market, industry analysts said Solbourne's pricing strategy may provide a useful "foot in the door" technique with customers unfamiliar with the smaller vendor.

Solbourne cut the cost of its \$4000 desktop server from \$5,995 to \$2,995, making it the lowest priced diskless Sparc system on the market. Other \$4000 products, all introduced in late 1990, took a similar slide down the price scale.

"We're more interested in the 4000 series now," said Doug Knudson, manager of production software development at Media Central, an advertising information company with a local-area network of Apple Computer, Inc. Macintoshes for data entry.

The firm recently chose a dual-processor Solbourne server over a Sun server in a competitive bid that turned on Solbourne's high-end symmetrical

multiprocessing capabilities and its well-reputed support organization. Media Central is considering Solbourne's low-end workstations for placement at some customer sites, Knudson added.

Solbourne's plan is to "use low-cost desktops to help us sell more servers," said Travis White, vice president of marketing at Solbourne. If the company depended solely on desktop systems sales, he added, "I'm not sure this would work."

Solbourne holds a unique position in the Sparc market because it sells a full range of systems from desktop workstations to high-end servers. Yet its highly profitable server business remains the company's key focus.

Solbourne recently gained more momentum in the database server market with the sale of \$1 million worth of Unix servers and workstations to Equifax, Inc., Media Central and Englewood, Colo.-based Great-West Life insurance company.

SOLBOURNE'S PRICING STRATEGY may provide a useful "foot in the door" technique with customers unfamiliar with the smaller vendor.

"Our primary interest was in Solbourne's server, but obviously, if they do good with this business, we will look at the rest of the product line," said Chuck Pugh, a technical manager at Equifax's national information service center in Atlanta. The consumer financial information firm is in the process of consoli-

dating several regional offices into the round-the-clock service center, using a Unix-based client/server network of Solbourne and Sun machines.

Despite Solbourne's newly aggressive pricing on its low end, analysts cautioned that all

Sparc-based vendors are vulnerable to Sun's activities in that market — much the same way the plug-compatible mainframe vendors have been at IBM's mercy. "There's that schizophrenia of competing with your supplier," said Sandra Gant, an analyst at Computer Intelligence/Infocorp.

CA links 20/20 to Masterpiece family

BY JOHANNA AMBROSIO
CW STAFF

ANAHEIM, Calif. — Computer Associates International, Inc. said last week that it will integrate its newly acquired 20/20 spreadsheet with the Masterpiece financial software family during the first half of 1992.

Also slated to ship then, said CA spokesmen at the Dexpo Fall '91 conference held here last week, is CA-Masterpiece 3.0 for the Digital Equipment Corp. VAX. It entered beta testing last month, with general availability scheduled for June 1992.

Integrating the VAX-based spreadsheet with Masterpiece will allow users to take data from the General Ledger portion of Masterpiece and insert it into 20/20. The spreadsheet was

purchased last month along with Access Technology, Inc. [CW, Nov. 18].

Masterpiece 3.0 includes CA-Masterstation, a version for local-area network and OS/2 plat-

CA-SUPER-PROJECT is a project management package for VAX/VMS with counterparts for MS-DOS.

forms, and CA-Mastervision, a Microsoft Corp. Windows-based decision support tool that converts financial information to charts. Mastervision 3.0 has already been announced for the

IBM mainframe environment.

In addition, CA unveiled a new option for CA-Tellgraf graphics software: a direct link to the CA:DB database management system for the VAX. This allows users to develop production- and graphics-oriented applications, CA said. Another product is CA-Superproject, a project management package for VAX/VMS with counterparts for MS-DOS and Windows.

CA also said that the following VAX products, announced last year, are now generally available: CA-1, a tape management system; CA-7, a work-load management system; CA-Visa, a systems management tool; CA-DB:Generator, application development software; and CA-QBYX, a Windows-based query management system.

Sparcstation tied to IBM net

BY JOANIE M. WEXLER
CW STAFF

MOUNTAIN VIEW, Calif. — Attempting to woo commercial users to Unix, Sunconnect, a Sun Microsystems, Inc. business unit, further integrated the Sun Sparcstation with IBM networks last week.

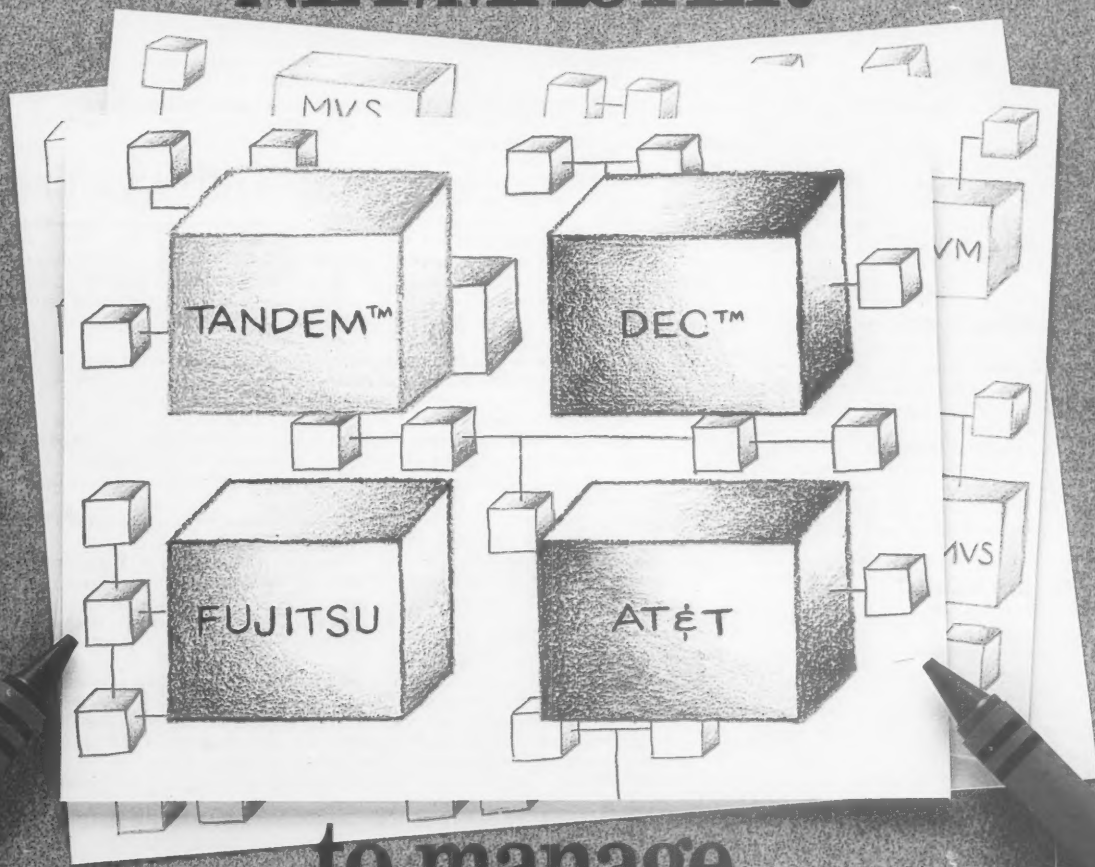
The company's moves included offering a 4M/16M bit/sec. Token Ring interface card for the Sparcstation to match the networking capability of rival IBM and Intergraph Corp. workstations. The company also announced links between Sun's Sunnet Manager and IBM's Netview network management systems and an interface for developing distributed applications that can span Sun and IBM networks.

Sun pointed to Scalable Processor Architecture (Sparc) proliferation in such areas as banking and insurance as the impetus behind enhancing its connectivity product line.

Cheryl Vedoe, Sunconnect vice president and general manager, said networking requirements in these environments are starting to match those of technical applications in that they include "a lot of processing power, expert system analysis and forms generation on the desktop."

An International Data Corp. survey of U.S. IBM System/370 sites revealed that about 75% as yet have no Unix strategy, said Peter Burris, director of IBM research. The main reason for this is that users have not received clear signals from Unix vendors about how their operating systems would interoperate with IBM environments, he said.

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NEWS SHORTS

Xerox layoffs to save \$150 million

Xerox Corp. expects to be 2,500 workers leaner by mid-1992, resulting in a \$175 million fiscal fourth-quarter charge, the Stamford, Conn.-based company announced last week. Xerox will cut staff via voluntary programs and layoffs in overhead areas of its business. The firm said it expects to save \$150 million next year as a result.

Losing her religion

Heidi Sinclair, Lotus Development Corp.'s public relations chief, jumped to rival Borland International, Inc., where she was named vice president of corporate communications. She was quoted in a published report earlier this month as saying she had "lost her faith" in Lotus. On the product side, Lotus shipped Notes 2.1 and scotched recent reports saying that it would merge the two DOS versions of its 1-2-3 spreadsheet software. Paul McNulty, director of product marketing, said Releases 2.3 and 3.1 will remain "two separate products for the foreseeable future."

Quotron takes a risk on IBM

Quotron Systems, Inc., a Citicorp subsidiary and leading supplier of financial information and trading systems, announced a five-year agreement last week with IBM to migrate its proprietary systems to the RISC System/6000 line of Unix-based servers. IBM will manage Quotron's nationwide communications network, providing "immediate cost savings and increased reliability" for its customers, Quotron said. On the desktop, Quotron said it will use IBM Personal System/2 workstations or IBM-compatible PCs running Microsoft Corp. Windows. The product rollout begins in early 1992.

The Ultimate verdict

The Ultimate Corp. was cleared of fraud and racketeering charges stemming from actions of its former president. A U.S. district judge found the East Hanover, N.J., company blameless in a 1988 lawsuit filed by Banc One Leasing Corp., which claimed Ultimate was liable for a \$9.6 million airplane loan guarantee and had participated in fraud against Banc One. Ultimate is also defending another suit brought by a different bank on similar grounds.

Quicktime rushed to market

Apple Computer, Inc. said last week that it expects to make available its Quicktime 1.0 multimedia operating system extension by the end of this month. Quicktime is a System 7.0 extension designed to ease the integration of sound, video and animation into Macintosh applications. It will be distributed as an add-on package until the next major revision of System 7.0, which is expected in the first quarter of next year. Quicktime will officially roll out to end users at Macworld Expo in San Francisco next month. In the interim, it can be downloaded via various electronic bulletin boards.

Hitachi doubles storage option

Hitachi Data Systems Corp. said last week that it will double the capacity of its IBM-compatible 7490 cartridge tape subsystem by moving to a 36-track format. The change will boost cartridge capacity from 200M bytes to 400M bytes, and users will be able to write data in both directions, HDS said. The new 7490E (\$569,100) drive will be available in September 1992.

It's a done deal

The letter of intent signed earlier this fall between IBM outsourcing subsidiary Integrated Systems Solutions Corp. (ISSC) and Chicago-based Continental Bank Corp. jelled last week into a 10-year, approximately \$700 million contract under which ISSC will take over most of the bank's information technology operations. Besides assuming computer and networking responsibilities, ISSC will oversee application software development.

More news shorts on page 115

Users ponder value of Wizdom

BY ELISABETH HORWITT
CW STAFF

AUSTIN, Texas — Tivoli Systems, Inc. last week unveiled Wizdom, the first group of applications based on the object-oriented framework of the Open Software Foundation's (OSF) Distributed Management Environment (DME).

Amoco Production Research is less interested in Wizdom's DME compliance than in the system's ability to administer user password privileges across an assortment of distributed Unix systems, according to Jon Tankersley, research scientist at Amoco Corp.'s research arm.

Tankersley, who beta-tested Wizdom, added that the object-oriented framework allows him to implement customized user access policies. He said he also liked being able to "delegate different degrees of administrative responsibility."

Wizdom addresses the needs of users who "want to do typical systems management tasks today, particularly in network environments," and who want the assurance that their applications will comply fully with DME in the future, said John Morrell, senior Unix analyst at International Data Corp. in Framingham, Mass.

However, initial Wizdom-based applications will provide comparatively limited functionality until the OSF releases its Distributed Computing Environment and DME services, sometime in the next year or two, Morrell said.

This caveat may cause some vendors to hold off on moving

their applications to Wizdom. Tivoli promises to span both the OSF and Unix International worlds, according to Tivoli President Frank Moss.

The initial version of Wizdom supports Sun Microsystems, Inc. Sun 3, Sparcstation and compatible workstations, running subsidiary Sunsoft's Solaris 1.0 distributed computing system. Tivoli plans to port its applications to OSF/1 Unix sometime next year, Moss said.

Furthermore, Unix International has announced that it has selected the Wizdom Environment as the systems management reference technology of Unix International's Atlas.

Wizdom is said to simplify the task of migrating existing systems to its framework by automatically going out to each node of the network, "discovering user relationships and configuration files" and converting them to object form, Moss said.

Lofty ambition

Tivoli's first assays into the DME applications market target systems administrators who are trying to gain control of rapidly proliferating distributed network systems. The Wizdom product line consists of the following components:

- Primary Resource Management enables systems administrators to monitor and reconfigure host systems and to track and control user privileges and security profiles across distributed Unix systems, Tivoli said.
- Privilege and Security Management is said to set up a distributed, collaborative system in which multiple people administer multiple levels of security across different network regions and user groups.

Each of the above products supports MIT's Kerberos security standard.

The Wizdom Environment forms the basis of the above applications and also offers a framework for independent software vendors that want to develop DME-compatible applications, Tivoli said. The platform combines an object-oriented framework and a "common look-and-feel," graphics-based user interface.

Primary Resource Management, including the Wizdom Environment, is priced starting at \$4,500 for a 10-seat network. Privilege and Security Management, including a copy of Kerberos, is priced starting at \$2,250 for a 10-seat package. Both are currently available.

ELISABETH HORWITT

Lotus to unleash overdue Mac 1-2-3

BY CHRISTOPHER LINDQUIST
CW STAFF

CAMBRIDGE, Mass. — It took four years, but Lotus Development Corp. is finally on the verge of getting 1-2-3 for Macintosh out the door. It should be on store shelves by year's end.

Lotus' 1-2-3 for Macintosh, which went into development 49 months ago, faces a tough battle in ousting the competition — Microsoft Corp.'s Excel and Informix Software, Inc.'s Wingz.

Apple Computer, Inc. Macintosh users contacted last week were split on whether they would switch to the new 1-2-3. While conforming to a company standard is high on their lists, it may not be enough to move users from other spreadsheets.

"We're not going to move away from Excel at any high rate of speed," said Larry Winn, applications development manager at Georgia Power Co. in Atlanta.

Winn said his company had standardized on 1-2-3 for DOS machines, but he added that he expected more "bells and whistles" on the Macintosh version than he had seen. "We're not very excited about it," Winn added.

Making the leap

One user who is going to make the jump from Excel is Don Adams, vice president of manufacturing at Armin Molding Corp. in South Elgin, Ill. Adams said he had tried other spreadsheets such as Excel, but Lotus "is still the best thing on the market."

Adams said he has written several manufacturing applications in Lotus and said he looks forward to being able to have 1-2-3 on his Macintoshes as well as his DOS machines.

The Macintosh version includes file, macro and keystroke compatibility with previous 1-2-3 releases. Keystroke compati-

bility is provided using the 1-2-3 Classic menu, which allows use of familiar "backslash" commands. It will also read and write Excel files, convert Excel macros and support the System 7.0 operating system.

Lotus' 1-2-3 for Macintosh requires a Macintosh with a hard disk drive and 2M bytes of random-access memory under System 6.0.4 or later, or 3M bytes of RAM under System 7.0.

The product will be available in Standard (\$495), Node (\$495) and Network Server (\$795) editions. The standard edition is scheduled to ship before year's end. Server and Node editions are scheduled for release by January. Lotus is offering a competitive upgrade policy that allows users of Excel, Wingz, Borland International, Inc.'s Full Impact (previously from Ashton-Tate Corp.) and Claris Corp.'s Resolve to receive 1-2-3 for Macintosh for \$150.



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Nippon Steel invests in Oracle — finally

BY JEAN S. BOZMAN
CW STAFF

REDWOOD CITY, Calif. — After nearly six months of negotiation, Oracle Corp. finally struck a deal with Nippon Steel Corp. last week, gaining \$80 million in financing and a new partner in the emerging Japanese market for Unix databases.

The pact, signed in San Francisco, surprised some industry analysts — who thought the deal was off after an October delay — but delighted some users, who said they think Oracle's financial troubles are finally over.

Oracle has already used the \$80 million to pay off its bank debt and has put the rest into the bank for safekeeping, said Jeff Henley, Oracle's chief financial officer. Originally, Oracle had asked for \$200 million from Nippon Steel, whose annual revenue totals \$19.3 billion.

"We don't need as much money because the company has done so well for a few quarters," Henley explained. "What was important was getting a good deal and the [business] relationship in Japan. There wasn't a gun held to our head."

A potential conflict between Nippon Steel's \$750 million systems integration

business and Oracle's new applications business was headed off by a value-added reseller agreement that prevents head-to-head competition in Japan, Henley said.

October's delay in signing the deal bought Oracle valuable time to renegotiate a \$100 million line of credit with a syndicate of seven banks. Users and analysts said they were pleased by the brinkmanship with which Oracle executives played their cards.

"I'm very impressed with the way these guys handled it," said Dale Lowery, director of advanced computing at VGS, Inc. in McLean, Va. "The deal didn't fall

apart. They lost nothing, and they got the money anyway." Only one year ago, Lowery noted, many users were "talking about whether Oracle was viable as a company or not."

No worry lines

The deal reduces worries that Oracle was going to ruin its fresh start in the potentially lucrative Japanese market by walking away from its potential business partner. With positive cash flow — and virtually no bank debt — \$1 billion Oracle seems to have removed the stigma of its 1990 losses.

"Oracle is tremendously better than it was at this time last year," said Tim McCollum, a senior analyst at Dean Witter in New York. But, he noted, "it's nowhere near the strength of a Microsoft or a Novell."

In exchange for the money, Oracle has agreed to allow Nippon Steel to buy up to 25% of the new Oracle Japan subsidiary by 1994. Meanwhile, Oracle opted not to sell any equity to the Japanese firm. Under the terms of June's tentative agreement, Nippon Steel would have owned 49% of Oracle Japan along with an option to buy a slice of Oracle Corp.

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CORRECTIONS

Knowledgeware, Inc.'s Information Engineering Workbench (IEW) and Application Development Workbench (ADW) suite of workstation tool sets ranges in price from \$3,795 to \$10,125 per unit, while a starter kit for new customers of all ADW tools is priced at \$25,000 and IEW tools at \$20,000. *Computerworld* drew its pricing from the latest edition of *Data Sources*, as Knowledgeware declined comment when asked for pricing [CW, Nov. 25].

Also, *Computerworld's* comparison of quarter-to-quarter revenue in the same piece should have compared year-to-year quarterly revenue figures, which reflected a decline from \$23.5 million in the first fiscal quarter of 1990 to \$21.6 million in the first fiscal quarter of this year.

A story printed Dec. 2 reported that Novell, Inc. shipped 8,000 copies of Digital Research, Inc.'s DR DOS 6 with copies of its Netware Lite. The actual figure was 80,000 copies. In addition, user reports indicated that while DR DOS 6 and Superstore will work simultaneously on a Netware Lite system being used as both a client and a server, performance under such circumstances may be unacceptable.

Hewlett-Packard Co.'s HP 9000 Model 867S and Model 877S come with six and 12 slots, respectively, not six and 12 processors, as was reported in the Dec. 9 issue of *Computerworld*.

Annual information systems savings for staff decentralization and data center consolidation at Amoco Corp. was approximately 10%, not 25%, as was reported in the *Computerworld Premier 100* [CW, Sept. 30]. Also, while a centralized personnel committee in Chicago establishes IS recruiting policies and procedures, decentralized offices in Tulsa, Okla., and Houston handle their own recruiting.

With recent price cuts, a low-end math coprocessor can be bought for as little as \$99, not \$500, as was reported in the Oct. 21 Product Spotlight.

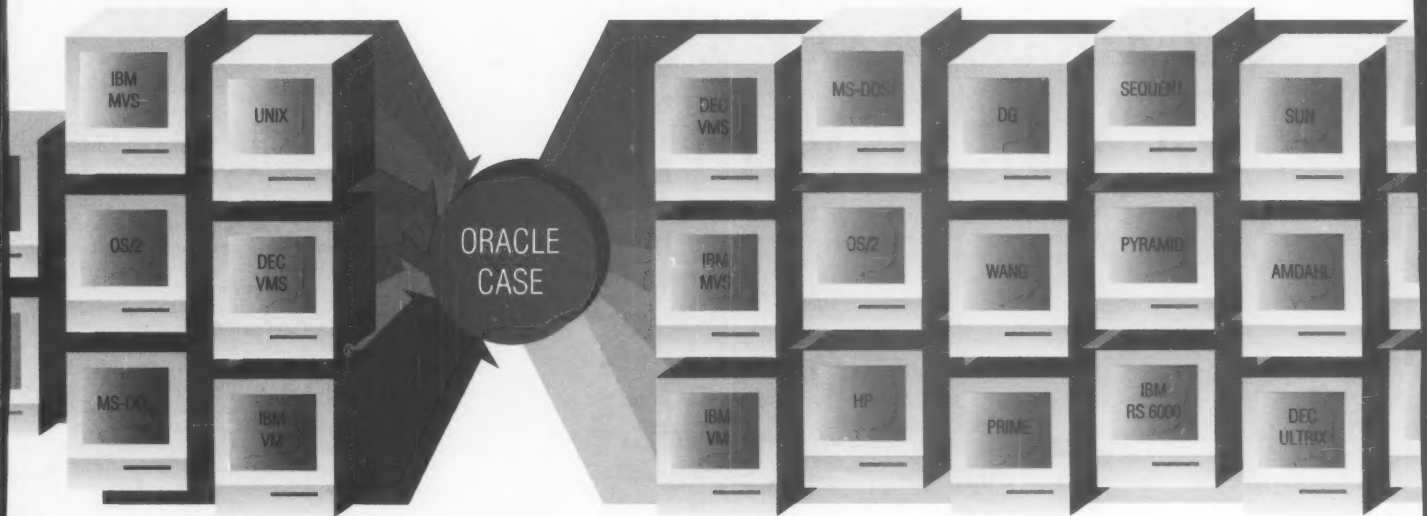
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Sears, Philips align to offer global SNA services

BY ELLIS BOOKER
CW STAFF

CHICAGO — Sears, Roebuck and Co. and Philips Electronics N.V. linked arms last week, interconnecting their IBM Systems Network Architecture (SNA) data networks to offer global SNA transmission services to other companies.

The alliance between Sears Communications Co. (SCC) and Philips Communications & Processing Services International forms a 445-node SNA network spanning 147 countries in North America, South America, Europe and Asia.

Both companies already run pure SNA

networks, supporting the far-flung businesses of their respective parent companies as well as outside customers.

SCC President Gary Weis said he defended the choice of SNA rather than an open protocol such as X.25 and added that "this is what customers have said they wanted."

The reliability and security features of SNA are still unmatched by open standards, Weis said. SCC and Philips certainly plan to support other protocols such as X.25 and Transmission Control Protocol/Internet Protocol as the market demands them, he added.

However, a pure SNA environment is

attractive to Steven Olson, vice president and chief information officer at The Harper Group, a San Francisco-based firm that is currently beta-testing the SCC/Philips offering. "We've continued to find difficulty in using higher level SNA transactions [such as LU6.2] over non-SNA networks," said Olson, whose freight logistics company uses a mix of value-added network providers, long-distance companies and private facilities to connect its 370 branches in 43 countries.

For the trial, which ends in February, Harper is using the SCC/Philips network to link an IBM Application System/400, which supports its operations in

Germany with a host mainframe in the company's San Francisco office. If the SCC/Philips network passes Harper's basic reliability and service standards, Olson said, the decision of whether to use it will hinge on pricing. Those details have yet to be issued by the partners.

The SCC/Philips alliance expands SCC's North American backbone to international points with Philips' 38-node worldwide network. For Philips, the relationship will replace its admittedly "thin" network in the U.S.

The two partners will offer "one-stop shopping" for network troubleshooting and circuit provisioning in each market they serve. Future enhanced services, such as electronic mail and electronic data interchange, are also planned.

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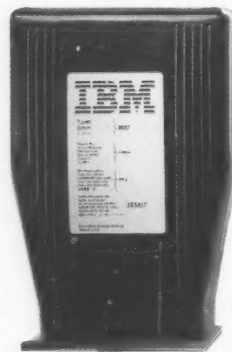
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DEC to extend VAX management

BY SALLY CUSACK
CW STAFF

MAYNARD, Mass. — Digital Equipment Corp. plans to deliver an enhanced version of its Vaxcluster Console Management System next April for centralizing distributed systems management in a single location.

The Vaxcluster Console system is a component of DEC's Polycenter strategy for providing enterprisewide control and security for computer operations.

"The latest version [Version 1.4] fits in with DEC's ability to tie together multiple data centers and underscores their ability or intent to help customers manage costs," said William Sines, an analyst at Technology Investment Strategies Corp., a Framingham, Mass.-based market research and consulting firm.

New features in Version 1.4 include an emulation package for running console simulations without affecting ongoing production operation, enhanced scan profile capabilities and high-availability system control functions achieved by installing the product on DEC's fault-tolerant VAXft platform, DEC said.

Log all data

The Console system was designed to log all console data, search the text for strings of characters, notify the user when matching text strings are found and permit the user to connect to the devices being managed.

Brett Coburn, VAX system administrator at Niagara Mohawk Power Corp. in Syracuse, N.Y., has been using Version 1.3 of the Console system for several months. The software has allowed Niagara Mohawk to centralize console locations and eliminate a fair amount of DEC VT terminals, he said. Console performance and status can be checked from remote locations, and console functions can be executed from a remote site.

"Foremost, this is saving us time. I can dial in instructions from home," Coburn said.

Niagara Mohawk has about eight DEC VAX/VMS systems running a variety of applications, including DEC's RDB database and All-In-1 office products.

Version 1.4 will be priced at \$1,384 per console connection. Discounts will be available for quantities beginning with five connections, the vendor said.

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D&B Software teams with Sybase to sell SQL Server

BY SALLY CUSACK
CW STAFF

FRAMINGHAM, Mass. — Dun & Bradstreet Software's evolving client/server strategy took a little more shape last week when the mainframe applications giant disclosed a strategic partnership

with Sybase, Inc.

Under the terms of the agreement, D&B Software will incorporate and resell the Sybase SQL Server relational database management system with its upcoming client/server products. The first of these products is targeted for delivery early next

year and is reported to be a general ledger application.

William Trester, implementation manager of management and administrative support systems at Jet Propulsion Laboratories (JPL) in Pasadena, Calif., said his company, which uses D&B software, "will implement

some limited form of client/server next year" but has not committed to any single vendor solution.

However, he said that client/server technology will play a significant role in JPL's long-term strategy, and the firm is evaluating several approaches.

JPL currently uses D&B's accounting and human resources packages in an IBM 3090 environment.

Sybase SQL will be incorporated into the D&B product as an application database engine on the server and will provide data integration at that level between D&B's existing host-based applications and upcoming client-based applications.

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Cognos offers query tool

BY CHRISTOPHER LINDQUIST
CW STAFF

BOSTON — Seeking to diversify its tools and applications business, Cognos, Inc. last week brought out a SQL query tool that requires no knowledge of SQL commands.

Impromptu is a Microsoft Corp. Windows-based SQL query tool intended to shield users from the complexities of learning the data access language.

With Impromptu, users will reportedly be able to extract data from supported databases without having any knowledge of SQL. Users select information from folders, and the SQL query is automatically generated and sent to the server. The package lists for \$695 for a single-user copy and \$3,995 for a server copy.

The Ottawa-based software vendor also demonstrated an Apple Computer, Inc. Macintosh version of its Powerplay executive information system. Powerplay displays data graphically, which allows users to point and click on graphical elements to retrieve information. The \$695 product is scheduled for availability next month.

Both products fall under Cognos' recently formed Desktop Software Division, which will be headed by Alan Rottenberg, vice president and general manager. The division will seek to "leverage existing sales channels" by adding value to existing products and to sell products into new markets.

New markets are already being explored by Cognos, as the string of announced alliances demonstrated. A deal with Lotus Development Corp. makes Cognos an Alliance Partner for Lotus Notes. The arrangement will allow Cognos to provide links between Powerplay and Notes, letting users share Powerplay information across the groupware system.

In another deal, Dun & Bradstreet Software will build Powerplay into future client/server products. Digital Equipment Corp. will also further Cognos' distribution goals by selling Cognos products directly, a DEC spokesman said.

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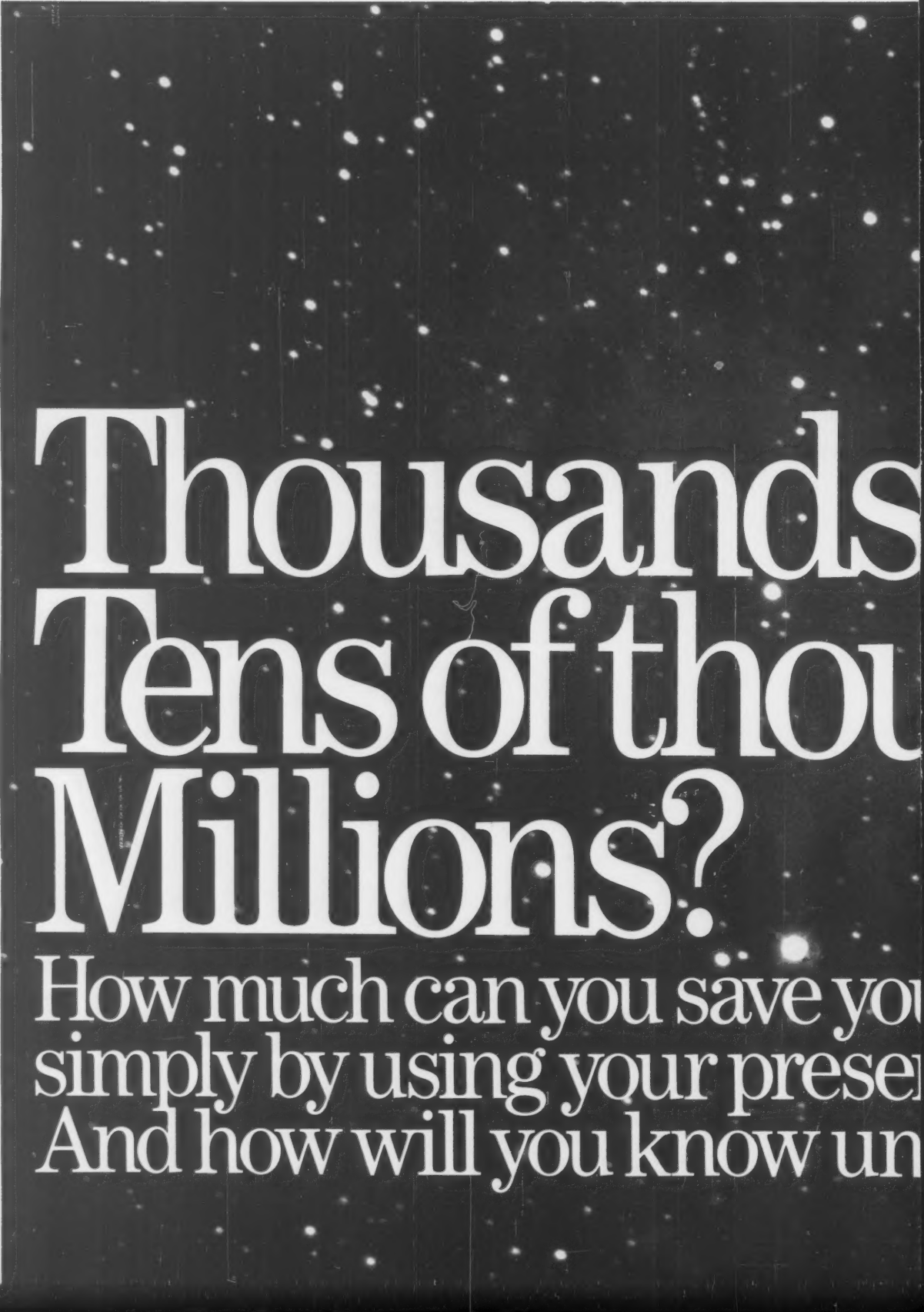
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HEWLETT
PACKARD

Computerworld covers own move to client/server

BY PAUL GILLIN
CW STAFF



The first part of a continuing series.

OK, so we don't practice what we preach.

Computerworld covers hot technology, but we don't use it to pro-

duce our own newspaper. Our 10-year-old computer system is based on a DEC chip that was introduced before some of our staff members were born. In an age of clients and servers, we live in a world of hosts and terminals.

So when our production system began to hit the wall a couple of years ago, we saw a chance to leap over the same hurdles that confront our readers.

During the next 12 months, *Computerworld* will downsize, distribute, network and go GUI. We will move from a computer system based on a 21-year-old DEC PDP/11 to a client/server network using reduced instruction set computing technology. We hope to recoup our \$850,000 investment in about 18 months. We'll write about our experi-

ence in our own pages.

Computerworld computerized in 1981, when we installed Atex, Inc.'s widely used newspaper automation system. The Unix-based Atex system features an excellent word processor and bulletproof file management. It also contains more obscure features that are critical to publishing — for example, precise control of letter spacing, accurate measurement of story length and a superior hyphenation dictionary.

About 18 months ago, we began looking into systems alternatives. Our main goal was to save money by replacing the cryptic format codes we use to design pages with an intuitive, graphical approach. We also hoped to save big money by combining our Macintosh graphics



Stella Johnson

CW's Linda Nelson: 'It is imperative that [the Atex system] grows with us'

with text in a single file. This would let us transmit to the printer complete, color-corrected pages that could go directly to film negatives and printing plates. We would save time in production, cut down on errors and give ourselves more control over the final product.

This is standard stuff in desktop publishing, but bringing it smoothly into a production operation with 54 writers, editors and artists while continuing to publish each week is another story.

Finally, we needed to cut hardware expenses. A single Atex circuit board can cost as much as \$12,000 to replace — about the same as a fully configured low-end workstation.

Most of the Macintosh-based systems we looked at had great graphics but lousy file management. A PC-based approach we seriously considered had good file management and a nice display but still used cryptic codes.

In the end, we decided to go with what had served us in the past. Atex, now an Eastman Kodak Co. subsidiary, is working with IBM to distribute its publishing system among IBM RS/6000 servers and PC clients on an Ethernet LAN. The Atex system has most of what we were looking for and a big bonus — smooth migration from our current system. Unlike other systems we had seen, it also promised full fault tolerance and data redundancy.

But the choice wasn't a no-brainer. Competition and a changing market had battered Atex for three years. The company had laid off hundreds of employees. Its financial stability was a concern.

In addition, the early versions of the system Atex proposed were bug-ridden and frequently crashed during demos. Most importantly, Atex wanted us to be a beta-test site, meaning any problems that arose would be our cross to bear.

But Atex executives also reassured us that the company's troubles were over and they'd be with us every step of the way.

Computerworld IS director Linda Nelson liked the plan Atex put forth. "Atex has helped us develop a network design which minimizes downtime," she says. "The system provides our IS staff the tools to reconfigure as CW's needs change. This system will be with us for the next seven to 10 years; it is imperative that it grows with us."

In August, Atex gave us a complete and relatively bug-free demonstration of its latest beta code. Despite our reservations, we decided to go with Atex. The first equipment arrived at our Framingham, Mass., offices two weeks ago.

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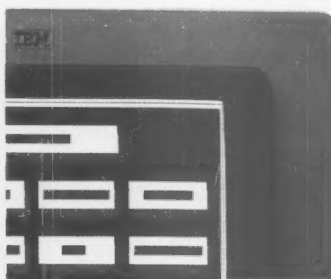
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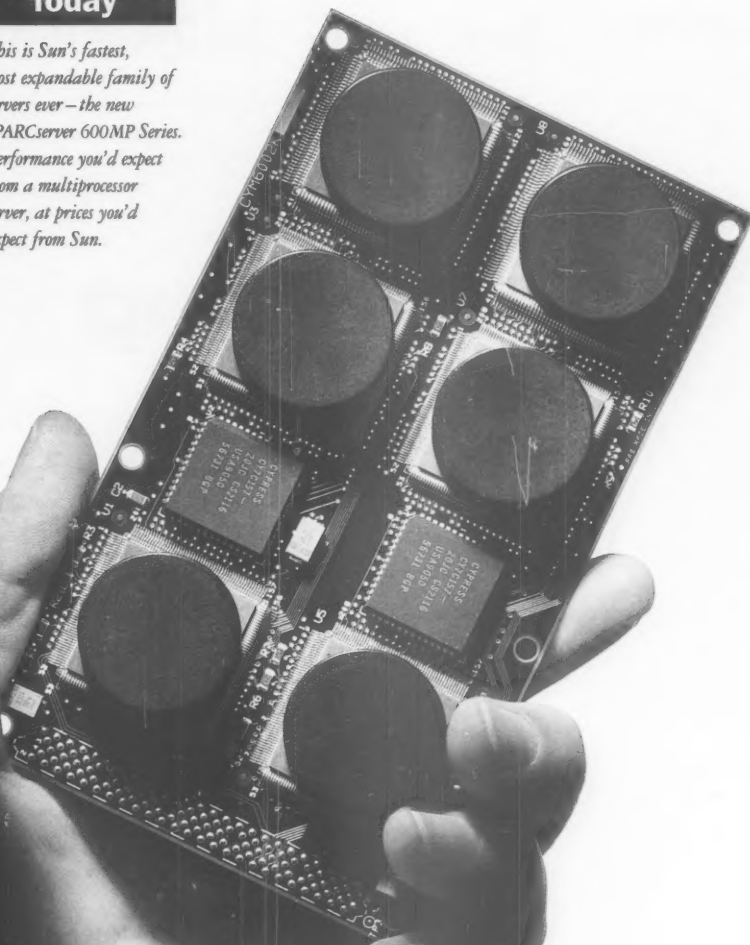
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ADVANCED TECHNOLOGY

TECH TALK

Wastewater what-ifs

■ Researchers at the Georgia Institute of Technology have developed a simulator that could help environmental engineers improve the performance of wastewater treatment facilities and lower the capital and operating costs of these plants. As water-quality standards become more stringent, systems to treat wastewater have become exceedingly complex. The computer simulator would allow engineers and plant operators to test different variables and to study how proposed changes to a plant would affect the treatment system.

Bright idea with light

■ Proxima Corp. in San Diego has developed a projection system for personal computers that allows a presenter to control graphics software on a PC by aiming a handheld laser pointer at the projected image on a wall. The system consists of a color LCD projection panel that fits on an overhead projector and a control system that includes the laser pointer and an image sensor that attach to the LCD panel. A sensor in the control system detects the laser spot on the image, translates its coordinates and conveys the information through the PC's serial port or Apple Computer, Inc. Macintosh Apple Bus. The system costs between \$6,000 and \$11,000.

Speech, speech

■ IBM will begin shipping in March 1992 a multimedia package of software and accessories that speech and language pathologists can use to help people with speech impairments develop their language skills. The IBM Speechviewer II analyzes words spoken into a microphone based on such characteristics as pitch, loudness and intonation. Letters or words that are correctly pronounced trigger gamelike animation on a computer screen and encourage the speaker to repeat the sound correctly, IBM said. It costs \$2,130.

Retooling smiles with CAD/CAM

Dentists turn to CAD/CAM to offer better fitting porcelain fillings at lower cost

BY MICHAEL ALEXANDER
CW STAFF

Dentists have generally been slow to cut their eye teeth on computer technology. Only 42% of dental offices in the U.S. use computers for billing and other business-related activities, according to "Dentistry Today," a trade journal.

However, competition for patients and a mounting interest on the part of dental patients — who no longer merely want their teeth fixed but also want to have the mouths of movie stars — are driving the more adventuresome dentists to equip their offices with the latest high-tech gear.

About 80 dental practices across the country are now using a computer-aided design and manufacturing system made by Siemens AG called the Cerec System D3255 to fabricate porcelain inlays and onlays — fillings, in other words.

Dr. Martin Gottlieb and Dr. Raphael Santore, who operate a dental practice in New York, have had the \$65,000 system for nine months. It is only one of two such machines in the New York area, according to Gottlieb.

Dentistry by computer design

The Cerec (shorthand for ceramic reconstruction) is an all-in-one system consisting of a miniature video camera, personal computer, specialized software and milling machine. Once the tooth has been drilled, the dentist uses

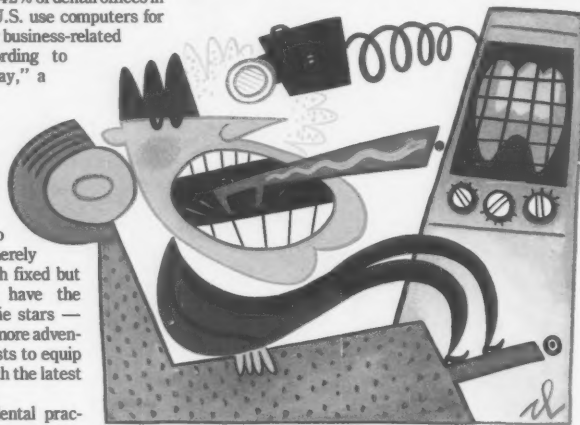
the video camera to capture an image of the cavity on a floppy disk. The computer calibrates the cavity's dimensions and operates a milling machine to sculpt a filling. Later, the filling is cemented into place. The software has a

strong, doesn't wear the opposing teeth, may last as long as the other fillings and may be more healthful than silver."

A silver amalgam filling is quicker, cheaper, lasts and has a track record of

150 years, said Dr. Dan Nathanson, professor and chairman of the biomaterials department at Boston University's School of Dentistry. However, silver fillings do not look natural, and there is mounting concern that the mercury content in silver fillings may be harmful, he said.

"The [porcelain] restorations don't corrode or darken like amalgam, they don't look metallic, and they are bonded to the tooth to seal it totally against bacteria and decay," Nathanson said.



Robert de Michiel

Looking good

The emphasis in dentistry is increasingly on aesthetics, another reason that porcelain inlays and onlays are growing more popular, despite the added expense.

Gottlieb's patients pay about \$450 for a restoration — about half of what they would if a laboratory did the work, Gottlieb said.

The machine is not without drawbacks, however. The \$65,000 price tag is daunting for most dentists. And the machine cannot easily mill a porcelain filling for cavities that have sharply inclined walls.

Nathanson is so sold on the technology that he said he is mulling over adding instruction in using the Cerec System in courses at the Boston University dental school.

graphical user interface that allows the dentist to select editing, milling and other functions from icons using a trackball.

"We take a picture of the hole we drill, the computer assesses the information, tells us which slug of porcelain to put in the milling device, and it cuts the porcelain block," Gottlieb explained.

The entire process takes less than two hours and can be completed in a single visit to the office rather than the two weeks normally needed for a porcelain restoration to be fabricated in a laboratory.

"The porcelain restoration works wonderfully," Gottlieb said. "It's the best filling we have: It's beautiful,

Neural network bests doctors at diagnoses

BY MICHAEL ALEXANDER
CW STAFF

A neural network succeeded more often than physicians in accurately diagnosing patients with heart attacks in an experiment at a San Diego hospital emergency room.

The network analyzed symptoms, electrocardiograms and other data from 331 patients who entered the emergency room complaining of chest pains. In 35 out of 36 cases, or 97% of the time, it correctly recognized the heart attacks. By contrast, the emergency room doctors correctly identified 28, or 78%, of the heart attacks.

Also, the network misdiagnosed the actual health problems of 11 patients

who did not suffer a heart attack, earning a 96% accuracy rating, while the doctors' rating was 85%.

The neural network was able to recognize heart attacks even when vital information was lacking.

The experiment was conducted by Dr. William Baxt at the University of California, San Diego Medical Center and was reported on in the December issue of *Annals of Internal Medicine*, a medical journal.

Future of emergency rooms

Someday, emergency room doctors will be able to enter patient symptoms, health history and other data into a handheld calculator attached to a personal computer to double-check their decisions and to help alleviate the pres-

sure of having to instantly diagnose patients, according to Baxt.

Neural network software and hardware are able to quickly match a wide variety of patterns, ranging from selecting plump tomatoes in an assembly line to identifying a tank rolling across a desert. If there is no precise match, the network selects the closest match it has been trained to recognize.

The neural network devised by Baxt was trained with symptoms from 356 emergency room patients thought to have suffered a heart attack and then told which of the patients actually had the attack.

Baxt said that considerably more training, using data from more patients and culled from several different sites, is still needed.

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EDITORIAL

Fruitcake

The holiday's a time for joys,
So now let's make some festive noise
For folks whose antics far and wide
Keep headline writers occupied:

For Gates, whose lights upon his tree
Spell out Windows N and T.
On Christmas morning, Bill asks just
that no one mention antitrust.

For IBM, whose shifting missions
Give users OS/2 conniptions.
For VP butts of Akers' ire,
If you can't beat him, then retire.

With Ashton-Tate upon its shelf
Borland must Dbase itself.
Two databases tend to bring
A Paradox in marketing.

Under Compaq's chairman's tree
A note of thanks from AST;
And Dell and friends think it's real nice
The postman's lately ringing twice.

For NCR and ATT,
A toast to merged bureaucracy
And product lines without a match
Even with each other, natch.

For ATT in years ahead,
Phone lines that can't be sev-er-ed;
Lotus hopes its mistletoe
Is filled with bugs in Quattro Pro.

Wang Labs' gift for all to see:
A stately Big Blue Christmas tree.
Sun's gift list is an easy mark:
Deck the halls with boughs of Sparc.

"Don we now CA apparel,"
Goes Pansophic's Christmas carol.
When CA merger wells run dry
It's 'cause there's no one left to buy.

Consulting firms sing Christmas cheer
With just one word: re-engineer.
But IS only wants the chance
To cut the cost of maintenance.

At EDS, the halls will ring
With jingle bells of outsourcing.
But IS sites aren't always joyous
When the boss has no employees.

The OSF would think it's great
Just to be called legitimate.
Consortia will end all woe
'Round 1996 or so.

Recession's grip we need not fear:
We're coming on election year.
So fatten budgets, pad your purse —
In '93, it might get worse.

Paul Gillin
Paul Gillin, Executive Editor



LETTERS TO THE EDITOR

IS staff needs user participation

"A painful revolution" [CW, Oct. 28] reminded me of the once popular image that information systems has failed because IS managers were reactive and not proactive.

The author listed a number of companies where the technocrat IS executive was squeezed out and replaced with a bureaucrat general-business executive. This technocrat/bureaucrat trade-off is only attacking the symptoms of the real problem. Technology is still the driving force behind most systems development.

Somewhere along the line, the idea of providing a service became synonymous with a reactive, and therefore ineffective, attitude. But what's wrong with providing a good service? Isn't IS a service function after all? Of course it is. Since users have the needs and receive the systems, they are the ultimate reason why IS exists.

In most cases, corporate goals will best be achieved if we are coaches, counselors and computer experts.

We must encourage users at all levels to contribute ideas and suggestions and be willing to respond quickly with system solutions.

Kevin Stumpf
Unusual Systems
Kitchener, Ohio

Pushing people

In "You can't manufacture market demand" [CW, Nov. 18], the author takes a reactionary stance toward innovation.

While I agree that there is a need for sensitivity in product planning, I find it unacceptable to rely on the marketplace alone to drive progress in applying technology.

The notion that technology should work the way people work is what has driven our replication of inefficient methods in the initial stages of automation.

People without significant motivation to the contrary will continue to do what they do in the way they do it.

We'd still be generating huge volumes of printed reports if the technologists hadn't forced on-line inquiry on reticent users in the 1970s and 1980s. Interactive video may seem as alien to the author as television did to my grandfather.

But with some intellectual curiosity and creativity, we may find that it can be a very useful tool in any number of settings, including banking.

The issue is that sometimes technology will not work the way people work: It will force people to change the way they work so that they and their processes become more effective.

George Pitagorsky
Pitagorsky Consulting, Inc.
New York

Timing issues cloud the point

In "Cash drain, no gain" [CW, Nov. 28], the author is correct that investment in information technology has had a disappointing effect on productivity. But his case is weakened by the time period cited for his survey data of U.S. and Western European companies: 1978-1984.

The workplace of 1984 was

one in which personal computers were still a novelty, word processing programs were clumsy, faxes were virtually nonexistent, laser printers were rare, and voice mail and electronic mail were futuristic schemes. Most office workers (including me) were computer illiterates.

The information technology environment of 1978-84 had more in common with the Eisenhower years than with 1991. There's no question that the author's basic point is fundamentally correct, but unfortunately, he is working off stale data from another site.

David Graulich
Maxfield Public Relations
San Bruno, Calif.

"Cash drain, no gain" [CW, Nov. 25] was excellent — except in one respect: The author fails to take into account the vast increase in government regulations that have been inflicted upon the American economy during the time frame he analyzes.

It would have been most interesting to learn just how many of those technological expenditures were made to comply with what are useless or even productivity-destroying government demands.

Damian C. Warther
Smith & Nephew Rolyan
Menomonee Falls, Wis.

Computerworld welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor In Chief, Computerworld, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701. Fax number: (508) 875-8931; MCI Mail: COMPUTERWORLD. Please include a phone number for verification.

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Women in IS shouldn't have to be tough

KATE NASSER



Computerworld disposed of the subject in one recent article [CW, Nov. 18].

There are two implications attached to this statement. The first is that sexual harassment does not exist in IS because IS women are tough enough to discourage it. The second is that sexual harassment is not a problem for IS, as long as the behavior is not witnessed there. Different assertions — neither true.

The toughness assertion is tantamount to saying women are responsible for the existence of sexual harassment in the workplace, which is patently untrue.

Understand this: Sexual harassment is a pernicious behavior in which one party attempts to exercise control, dominance and intimidation over another. The fact that some IS women are capable of dealing with these menacing situations does not mean that sexual harassment does not go on. It does. I know because it happened to me when I was a full-time IS employee.

Am I tough? Yes. Lots of people will testify to that. But that

did not prevent the harassment from occurring.

In my case, the sexual harassment came from a client director. When it happened, I asserted that I was only there to analyze new system needs. He closed the door and persisted. I left the room, went directly to my boss and objected. He laughed and told me the client was only kidding.

It was only when I banded my

other women in IS deal with harassment, but it definitely won't prevent such situations from occurring. Not all men are put off by toughness, and those in authority that are can take steps to block a woman's advancement. This control and domination is all part of sexual harassment.

The toughness theory is a comfortable escape for executives and management. It offloads organizational responsibility to the individual. It reduces the whole situation to one of blaming women for the unacceptable conduct of their male colleagues.

The theory that toughness can serve as a preventive measure also sets a dangerous behavioral model for IS and for women because it implies an unworkable and untenable solution.

If this is seen as the best way to keep sexual harassment at bay, then IS will not only have to look for technical expertise in female job applicants, but also try to assess the fighting capability of those it wishes to

hire.

In addition, there is a mixed message here that says, "If you are tough, you will not be sexually harassed. If that theory fails, you should be tough enough to deal with the problem on your own."

Management's silence on the subject directs harassed women to keep quiet. I have female IS contacts who share details of

their harassment experiences with me but have said nothing in their organizations. They are toughing it out temporarily, but at least some of them are looking for new positions.

Rather than passing responsibility to individual women, IS should be proactive in preventing sexual harassment. Hidden sexual harassment can lead to disgruntled staff, impede team interaction and lead to costly and disruptive turnover.

It's also important to remember that IS no longer operates in an insular environment. As my own experience illustrates, harassment isn't always just a departmental matter. It can involve business clients, either as perpetrators or as victims. Although some people claim that men do not understand that their behavior is sexually harassing, the claim of ignorance will not salvage a department's image if IS staff members impose objectionable behavior on clients.

For all of the reasons noted above, IS management should be taking a proactive and educational stance on this issue, not simply enforcing company policies and procedures on the handling of sexual harassment claims. They should actively discuss the problem and denounce such conduct as inappropriate and unmanly. The number of incidents reported is not an accurate measure of the problem, and if management waits for the reported numbers to rise before taking action, they are implying that sexual harassment is acceptable in small doses.

Nasser is president of CAS, Inc., a New Jersey-based IS management consulting and training firm.



Bob Dehn

fists on the desk and promised to sue the client, the company... and him — as an accomplice in sexual harassment — that the boss' attitude changed. Once he realized that I was not kidding, he entreated me to sit down and relax. I refused. I did not need soothing or patronizing. I needed action. Action was taken. I stayed on in IS and did not sue.

Similar toughness may help

Hear this, PC industry: 'It's time to grow up'

READER'S PLATFORM

LYNN A. LAHMAN

As a manager whose responsibilities include the support of PCs in a large corporation, I have followed the progress and developments in PCs with great interest for a number of years.

I have viewed with great excitement (and occasional trepidation) the progress that my firm's end users have made in understanding how to apply this technology to their areas of responsibility.

I have also seen, with great disappointment, the lack of sensitivity that vendors and resellers show toward production systems that are based on PC

technology. Software vendors continue to attempt to pacify us with responses such as "That will be fixed in the next release," and "Our new product XYZ will provide that function." Resellers continue to deny responsibility for products they sell and try to bill us for "support" activities that are nothing more than disguised debugging efforts.

I guess you could say I am frustrated. I believe there must be a better way of dealing with such matters. Furthermore, I believe it is imperative for the industry to mature and for accountability to be established if PC-based systems are to become a viable and reliable platform for production business systems.

I am proposing the develop-

ment of a new professional association. This association would consist of end customers. Its charter would be to promote safeguards that encourage the use of PC technology in production business systems. I would envision the following responsibilities for such an organization:

- To develop guidelines for acceptable PC software license agreements.
- To work with member organizations to implement such software license agreements.
- To develop guidelines for software developers regarding problem/change management.
- To "certify" individual software developers' procedures in problem/change management.
- To develop guidelines for contracts with resellers in the area of product support.
- To work with member organizations to implement such agreements.
- To publish a newsletter that covers area developments.

• To provide a powerful voice for communicating with software developers on the handling of problems and errors.

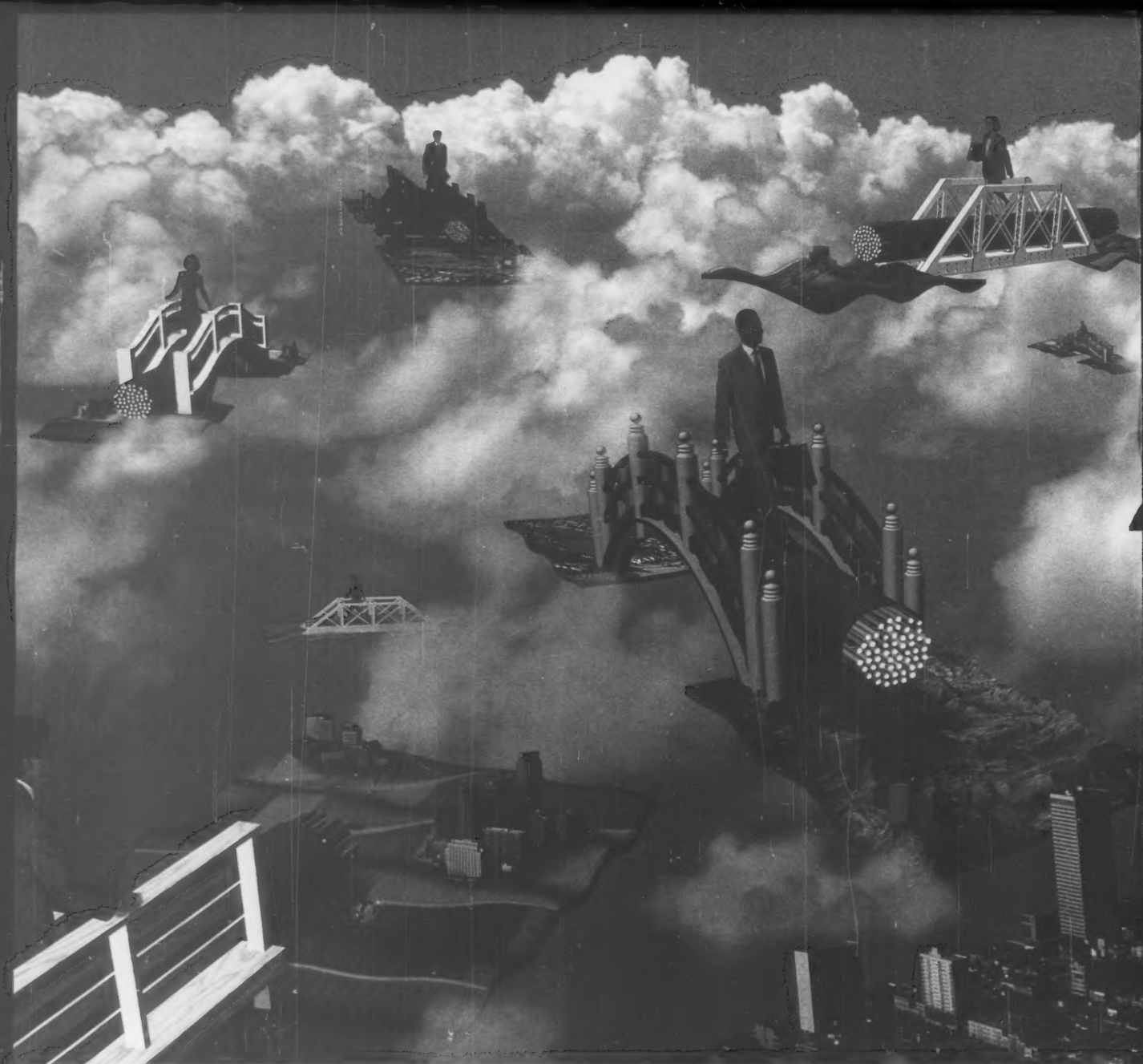
• To provide a directory of known problems, fixes and workarounds in established products.

• To assist in reorienting the PC industry to standards for production-oriented systems.

Obviously, if such an organization is formed, there would most likely be some other charter responsibilities. However, they would have to remain consistent with the goal of maturing the PC vendor and reseller relationships with end customers.

I would like to know if there are others within the business community interested in the formation of such an organization.

Lahman is director of information services at The Dial Corp. Interested readers may contact him at the following address: The Dial Corp., Attn: AUPPCS, Greyhound Tower, Phoenix, Ariz. 85077-2333.



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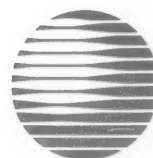


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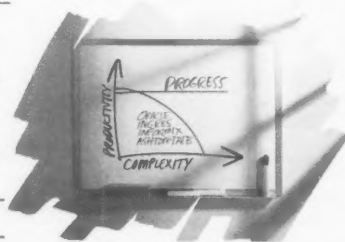


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SYSTEMS & SOFTWARE

HARDWARE SHORTS

Ross rolls out Promix

Ross Systems, Inc. in Redwood City, Calif., recently rolled out an integrated manufacturing, distribution and financial software package designed for Digital Equipment Corp. VAX/VMS users with global operations.

Called Promix, the software is targeted at batch manufacturers in industries such as food and beverages, chemicals, pulp and paper products and pharmaceuticals. The system addresses process requirements, such as finite scheduling, co-product and by-product costing and process costing functions.

Incorporating 12 integrated modules, license prices range from \$100,000 to \$750,000 per installation, based on CPU size and number of users.

For the second year in a row, *Nihon Unisys Ltd.*, the joint venture of Unisys Corp. and Mitsui & Co., ranked first in customer satisfaction in a survey of Japanese computer users conducted by *Nikkei Computer* magazine. The 8th General Computer User Census, published in October 1991 by Nikkei Business Publications, Inc., surveyed users of Fujitsu Ltd., Hitachi Ltd., IBM, Mitsubishi Electric Corp., NCR Corp., NEC Corp. and Unisys mainframes.

Garbage collectors do dirty work of OOP

BY JEAN S. BOZMAN
CW STAFF

SAN FRANCISCO — Garbage collection is not a very pleasant job — even in the universe of object-oriented programs. But like trash pickup at your curbside, it must be done.

In object-oriented terms, garbage consists of "orphaned" objects that are no longer needed by the program or the computer user. Object-oriented refuse has existed for a long time, but the proliferation of this technology has brought to the forefront the problems this garbage can create with memory management and performance.

The very nature of object-oriented programming creates a cadre of clutter problems. Objects "inherit" the characteris-

tics of their parent "objects" — bringing all former character traits and adding to them. Pro-

cessing creates hundreds of "intermediate" objects as a spreadsheet is being filled out or an engineering drawing is being refined.

Garbage collectors are small programs that have just enough intelligence to spot the orphaned objects in a crowd. "You know it's garbage when nothing is really pointing to it anymore," said Ed Horst, director of marketing at Servio

Corp., an object-oriented database firm in Alameda, Calif. "The system will act like a

scratch pad," he said. "Once you are no longer referencing those objects, it will automatically collect the [garbage] objects, then compress the freed-up memory space." In this way, garbage collectors restore fragmented chunks of memory, he said.

There is a debate in the development community now over the need for garbage collectors. Many C++ programmers ar-

gue that the agents are not needed if good programming conventions are followed.

"Garbage collection is quite computation-intensive," said Gene Wang, vice president of the Languages Business Unit at Scotts Valley, Calif.-based Borland International, Inc., which sells a version of the C++ object-oriented language. "The issue is really a question of runtime performance vs. automatic memory management."

Even if slower performance were acceptable, many commercial sites might object to the unpredictability of garbage collectors' irregular cleaning schedules, Wang said. He added that many times, the clean sweep occurs while an application is actively working on a task.

Continued on page 38



SAS launches product for drug companies

BY GARY H. ANTHERS
CW STAFF

CARY, N.C. — In the first of what the company hopes will be a series of products for vertical markets, SAS Institute, Inc. has sent beta-test copies of a pharmaceutical software product to 10 large companies.

Called SAS/PH-Clinical, the package is tailored to the access, analysis and presentation of data from clinical trials of new drugs. Its development was based on input from 30 drug companies, said Susan Carroll, pharmaceutical industry account manager at SAS.

The product is in an early stage of evaluation at Du Pont-Merck Pharmaceutical Co. Ran-

dall Carlson, a senior systems analyst, said Du Pont-Merck may use it to provide data electronically to the U.S. Food and Drug Administration (FDA) and for internal analysis and reporting. He said the FDA has said it will increasingly expect data to come in electronically but has not yet made it clear just what data is expected that way or how it is to be formatted.

The FDA move to electronic filing is part of a broad program at the agency to reduce the time it takes to get drugs through the paper-intensive approval stage and onto the market. Today, that process sometimes takes years.

Carlson said he expects SAS Institute to be responsive to changing FDA requirements.

"They do a good job of tracking user comments and getting their requests into new releases," he said.

Price a stumbling block

Carlson said Du Pont-Merck found the price of the package — \$200,000 for the first year and first CPU, \$100,000 for annual renewal — "hefty," and he said he hopes SAS will rethink the pricing. The industry-specific package must also be accompanied by the base SAS system plus SAS software for graphics, statistics and full-screen interaction.

SAS/PH-Clinical will begin shipping next month for IBM mainframes running MVS and VM/CMS and for Digital Equipment Corp. VAXs running VMS.

SAS calls the product an "exploratory tool," an extension of the drug researcher's laboratory. "Work done in the lab produces a tremendous amount of data, but the job is not over

then," Carroll said. SAS/PH-Clinical enables statisticians to browse through the data in flexible and creative ways without knowing what the results may be, she said.

Carroll said the product will enable doctors to do simple statistical analyses of clinical data and produce reports and graphs on their desktops without relying on statisticians and SAS experts. "Before, they didn't have an easy way to get at data without some computer programming background," she said.

SAS has other industry-specific offerings on the drawing board, including applications tailored for the insurance, financial and discrete manufacturing industries. Software development has begun for the financial product, Carroll said.

She added that SAS hopes to sell SAS/PH-Clinical to 25 to 30 drug companies in the first year and eventually to see it installed in as many as 75 firms.

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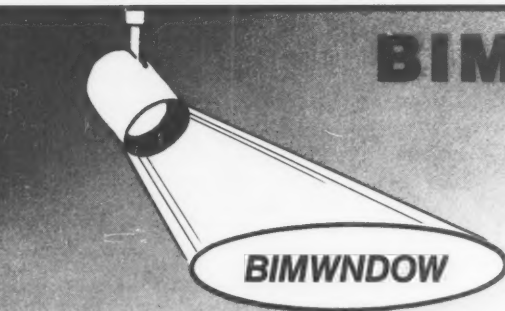
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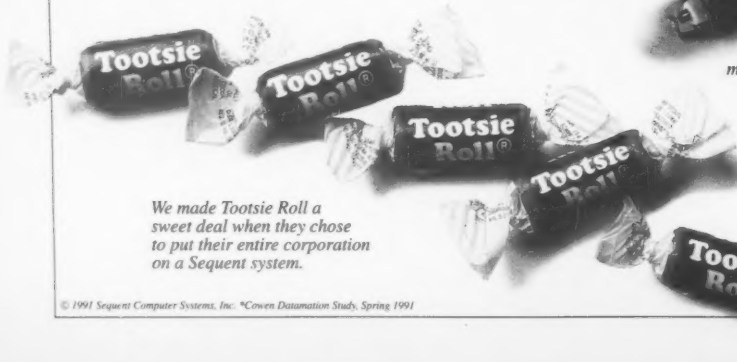
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SEQUENT

DEC sales force: 'A lot to learn'

Customers say reps must understand user needs, product capabilities

BY SALLY CUSACK
CW STAFF

While a bloated Digital Equipment Corp. will be laying off several thousand more employees to "right-size" the organization, the greatest challenge the engineering-focused company may face in the near future is to ac-

qu shore enough marketing savvy to satisfy existing customers and attract new ones.

Dave Austin, a DEC customer and software services manager at Arkwright Mutual Insurance Co. in Waltham, Mass., noted that the DEC sales force has recently been bombarded with so many new products, they are "going to have a tough time keeping abreast of everything,

while interpreting its use in terms of customer benefits."

DEC's challenge to become more market-driven will be tested by new announcements. In recent months, DEC has done the following:

- Linked up with Microsoft Corp. to strengthen its position on the desktop.
- Excellent hardware and software engineering.
- Semiconductor manufacturing techniques.
- Advances in disk-drive technology.

CW Chart: Michael Siggins

• Launched a variety of price/performance competitive workstations.

• Restructured its software licensing policy to reflect individual user needs.

• Given the public a glimpse of Alpha, its next-generation computing platform for supporting both DEC's proprietary VMS operating system and OSF/1.

Austin acknowledged that

DEC excels in engineering, but he pointed out that the sales force "still has a lot to learn about a business environment."

Arkwright has DEC VAX and Microvax systems installed at its headquarters and in 29 sales offices located throughout the country.

Room for improvement

"The one change we don't see at DEC is that they are becoming more marketing oriented," said Peter Schay, vice president of midrange computing strategies at Gartner Group, Inc. in Stamford, Conn. "This is absolutely necessary."

Chris Christianson, an analyst at Meta Group, Inc., a market research and consulting firm in Westport, Conn., said he agrees that marketing is DEC's weakest area.

"The sales force and marketing people need a deeper understanding of user requirements and the product's capabilities in solving problems," he said, adding that the sales force needs to communicate to users beyond the "speeds and feeds" level.

Some DEC customers appear to have sidestepped the shortcomings of the DEC sales force by taking a more active approach.

Michael Simmons, executive vice president at the First National Bank of Boston, said his technology strategy for the next 18 months has been laid out for DEC.

"They have been able to give me pretty much what I need," Simmons said, adding that he meets with engineers and top scientists at DEC when making determinations.

Simmons said he does not suffer from communications problems with the DEC sales force, and he states the ground rules up front: "I have an understanding

with my major suppliers — I don't like snake oil salesman. And while I want the leading edge of technology, I don't want the bleeding edge," Simmons said.

For DEC's future growth, Schay said the company would do well to pick up some of the IBM sales and marketing executives that fell victim to that company's last downsizing fallout.

"Let the field service technicians and software engineers do what they do best, and let the others do marketing and sales," Schay said.

Task at hand

DEC's technology strengths are offset by business and marketing obstacles



DEC challenges

- Developing a companywide marketing focus.
- Investing in long-term sales and sales management training.
- Furthering company downsizing.

DEC strengths

- Excellent hardware and software engineering.
- Semiconductor manufacturing techniques.
- Advances in disk-drive technology.

SOFTWARE SHORTS

Software outlays to climb

Despite an unrelenting recession, users will spend 14% more money on applications software in 1992 than they did this year, according to a recent survey by Input, a market research company. The firm predicted that while sales of minicomputer and mainframe software will grow at somewhat less than industry average, revenues for workstation and personal computer-based software will grow at about 20% over 1991 levels.

When you buy new products from Boole & Babbage, Inc. next year, you may opt for on-line documentation instead of traditional hard-copy manuals. The Sunnyvale, Calif., firm recently bought IBM's BookManager technology to let users do fuzzy searches, create their own bookshelves to link files and add customized information. Users will be able to download the MVS tapes to read them on MVS, VM, DOS and OS/2 systems.

Informix Software, Inc. extended its joint marketing agreement with ICL, a subsidiary of Fujitsu Ltd., to include porting the Informix-SE and Informix-Online databases and some software development tools to ICL's Unix servers.

COMMENTARY

Richard Fisher

Optical discs best at 12 in.



The advent of imaging owes a lot to optical disc storage and its ability to provide a

unique, high-capacity, cost-effective, removable random-access storage solution. The major breakthrough is the fact that it's 10 to 20 times more cost-effective than magnetic storage.

That still leaves the question of which optical disc drive to choose. It doesn't help matters that since the early 1980s, there's been so much action in the optical market:

• **Mid-1980s:** 12-in. write-once optical is the dominant form factor in the U.S.

• **1985:** Two or three vendors start to offer 5¼-in. write-once optical, which becomes widely available in 1988.

• **1988:** Rewritable (erasable) 5¼-in. optical discs are introduced.

• **1990:** The 5¼-in. multifunction drive — which can write and read write-once and rewritable media in the same drive mechanism — is introduced. At the same time, the rewritable 3½-in. optical disc is brought to market in the U.S.

Although 5¼-in. drives are used in imaging, 12-in. drives are the most economical in terms of cost per image stored. This is true for large to very large image systems that require more than 500,000 images or more than 200G bytes of storage.

Optical drives and media in the 12-in. category have doubled and nearly tripled in capacity in the past three to four years without significantly raising drive and media price. Overall cost has dropped by more than 50%, providing an acceptable cost-per-image-stored ratio for large document databases.

Although a similar doubling in capacity is expected in the 5¼-in. class in the next two to three years, the cost-per-image-stored ratio will still be higher than what the 12-in. has achieved.

At today's prices, the average cost per image stored (or per megabyte stored) on 5¼-in. optical disc is approximately two times higher for the drive and two to three times higher for the media than for 12-in. optical

discs on medium to very large imaging systems.

This is probably why the 5¼-in. format is preferred by manufacturers of stand-alone and small to medium-size LAN-based imaging systems.

This differentiation holds true for images stored in robotic libraries, but the costs can be as much as five to six times higher for 5¼-in. drives, where very large capacities of 500G to 1,000G bytes (10 million to 20 million letter-size pages) are stored.

A 12-in. optical disc drive can also provide as much as 10 times more information on-line (capacity per disc side) than a 5¼-in. one.

The picture changes from a performance perspective. In terms of drive seek times and robotic library access times, 5¼-in. drives beat 12-in. drives by a factor of two to three. Multiple 5¼-in. robotic libraries can provide multiple access paths to the lower capacity optical media.

Important to note is that price/performance trade-offs are relevant only to users who need intensive access to the image da-

tabase, such as in heavy volume transaction-processing systems. For most file folder or customer service-oriented applications, the issue of access volume and frequency to the optical disc database is not typically a major performance issue.

Debates aside, the 5¼-in. drive is bound to gain popularity over the years, even in very large image systems. For one thing, IBM announced at the 1991 Association for Information and Image Management show that it will be

standardizing on the 5¼-in. write-once format for its Image Plus imaging system. Hewlett-Packard also reinforced its commitment to 5¼-in. with a new line of robotic libraries and a multifunction drive.

The growing popularity of multifunction technology will also help drive this smaller form factor. That is not to say that imaging users will switch their preference from write-once discs; rather, multifunction drives will become popular in settings where the imaging workstation or server is also being used for nonimage applications that require erasability. It

is more economical in these cases to have one type of drive that can write and read both write-once and rewritable media.

In fact, the 5¼-in. multifunction drive is expected to eventually become the overall market growth leader. This is assuming, of course, that a formal or de facto standard drive and media configuration rapidly evolves.

That's no small assumption. The manufacturers of multifunction drives have formed three separate camps, warring over issues of integrity and performance during write operations. This is wreaking havoc not only for the standards committees — which are now working toward logical format standards for 5¼-in. drives — but, more importantly, for users.

If the manufacturers really want to do something for the users, they or a standards body should agree on a common approach so that the goal of reducing price and creating demand can finally be achieved.

Until the ecopolitical barriers between the competing manufacturer groups are dissolved, the imaging system user is faced with making the cost/performance and vendor trade-offs.

Fisher is president of Fisher & Co., a consulting firm in Los Gatos, Calif.

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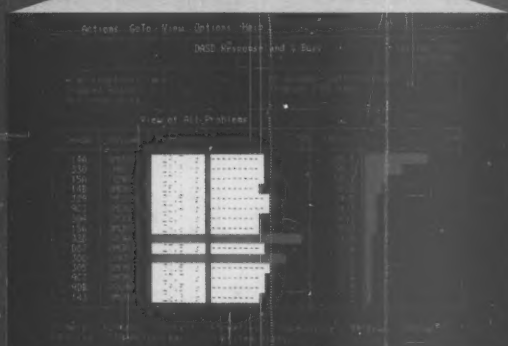
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SAP changes the way customers do business

BY JOHANNA AMBROSIO
CW STAFF

Some might think the installation of complex, host-based software is an end unto itself. But other users see it as a perfect opportunity to do business process re-engineering at the same time.

For the past year, Dow Brands, Inc. in Indianapolis has been installing SAP America, Inc.'s mainframe modules, including accounts payable, accounts receivable, purchasing and order entry. Some 18 people are dedicated full time to the project, which is scheduled to be finished by the beginning of 1993.

The timetable is stringent because Dow Brands is looking at, and in some cases changing, how its consumer packaged-goods businesses operate. The company's brands include Ziploc food-storage bags, Handiwrap plastic wrap and Fantastik cleaner.

"We look at SAP as an enabler," said Richard W. Glover, vice president of information systems at Dow Brands. "The integration within the SAP modules is a catalyst to allow us to look across boundaries. It forces you to do things cross-functionally because that's how the software is organized."

Two areas where this is happening, he

said, are account profitability and trade promotions. Account profitability is the ability to track by product or by customer the amount of revenue and profits each generates. Similarly, trade promotions refers to figuring out whether a particular promotion — cents-off coupons, for example — is yielding new business.

Glover declined to provide details of how business changed in each case, citing the proprietary nature of both areas, but he said the SAP installation process "has already altered several things we do. We're realizing real benefits, like streamlining business processes, even before the software is in production."

Mobil Corp. in New York installed SAP's purchasing module to simplify its European operations after a corporate-wide re-engineering initiative was already under way. "The process begins with a business plan and ends up with a

"WE LOOK AT SAP as an enabler."

RICHARD W. GLOVER
DOW BRANDS

systems plan," said J. P. Bailleux, worldwide systems manager at Mobil's Marketing Refining Division.

Mobil looked at the existing purchasing systems used at 16 affiliated European companies and found 11 different systems, "effectively creating a brick wall between them," Bailleux said. "There were data integration problems and insufficient support." He said the SAP system is allowing "substantial" savings by streamlining operations, and there are fewer errors in billing and invoices.

"Integrated systems like SAP require IS involvement because they are horizontal," Bailleux said. "Sometimes, we're in too much of a hurry to put in a system because of user requirements, but you need to look at business processes first."

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Inference revises ART/IM, CBR

BY JEAN S. BOZMAN
CW STAFF

EL SEGUNDO, Calif. — Inference Corp. recently updated its product line, adding tools to its ART/IM knowledge-based system for use with IBM's MVS operating system and enhancing the 9-month-old CBR Express case-based reasoning system. In doing so, analysts said, Inference is trying to compete more directly with two other artificial intelligence companies: Aion Corp. and AI Corp.

The Inference products now run on more platforms, including personal computers running Microsoft Corp.'s Windows 3.0 and a wider range of Unix machines. At the same time, the mainframe MVS version of ART/IM has a new set of object-oriented software tools to develop knowledge-based systems, the firm said.

CBR Express 1.1, an application shell that is layered on top of the ART/IM Inference engine, can now be run under Windows; it has been modified to require less memory and to run faster than before. "ART/IM had a very narrow market," said Neena Buck, a senior AI analyst at New Science Associates in Southport, Conn. "It was targeted at developers, so you had to be a pretty good programmer to use it."

The 12-year-old firm's product moves may have been largely defensive, Buck said. "There has been a lot of shakeout in the AI market," she said. "The companies that have survived are all extremely competitive." Inference has a well-established user base, including The Boeing Co., American Airlines and Ford Motor Co. However, it has remained a relatively small firm, with 160 employees and \$18 million in revenue.

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"Our On-line Banking system has been in production for more than 12 months—500,000 transactions a day—without a single code failure. And we had very few enhancements to do. Our users got what they needed the first time out."

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"To meet the dramatically reduced time-to-market requirements for our products, we need high-quality systems that can be changed fast. That's why we've chosen the IEF as the CASE solution for our entire organization."

John Pajak
Executive Vice President
Mass Mutual Life Insurance



"The strengths of the IEF are clear-cut. One obvious quality advantage is that application changes are made to diagrams, not code. This ensures ongoing integrity—the specification always matches the executing system."

Paul R. Hessinger
Chief Technology Officer
Computer Task Group



"I've seen other CASE tools fail, so I raised the bar high when we evaluated the IEF. It passed with flying colors. I could not be happier with my decision to adopt the IEF company-wide."

John F. Mott
President
AMR Travel Services



"Our users were extremely pleased when we finished our first project—a 60-transaction system—in one-half the budgeted time. We had tried interfaced CASE tools without success. IEF integration makes the difference."

Giorgio Sorani
Division Head – MIS
Lubrizol



"We are using the IEF to develop a new generation of manufacturing systems replacing over 300 existing systems. We estimate that IEF will increase our productivity by between 2-to-1 and 3-to-1 for new systems development."

Wal Budzynski
Head of Operations, Systems/Computing
Rolls-Royce



"The IEF offers dramatic improvements in productivity, yet it's easy to learn. One example: We trained 23 developers, including 18 new hires, and then completed a large order processing system—300 transactions—all in only 20 months."

Venkat (Vinnie) Tiruvilumala
Director, CPC/PPC Information Systems
SONY Corporation



"Our first IEF system was completed faster, and with fewer errors, than any system I've ever seen. If I had to go back to the old ways, I'd find another job...outside the DP world. It means that much to me."

Mogens Sorensen
Chief Consultant
Nykredit (Denmark)

Open information systems with productivity and maintainability.

The success of Texas Instruments CASE product is proven—in the field.

Major companies have used TI's CASE product, the Information Engineering Facility™ (IEF™), for everything from rebuilding aging high-maintenance-cost systems to development of new enterprise-wide strategic systems.

Study shows zero code defects.

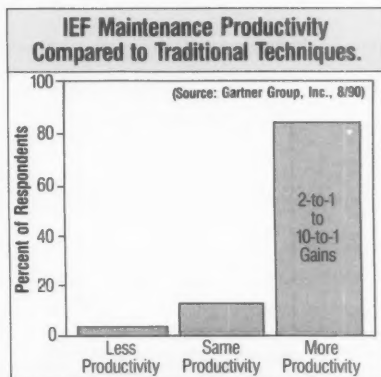
The quality of IEF-developed systems is remarkable. In recent CASE research by The Gartner Group, application developers were asked to report the number of abends they had experienced. (An "abend" is a system failure or "lock-up" caused by code defects.) IEF developers reported zero defects—not one abend had occurred in IEF-generated code.

Maintenance productivity gains of up to 10-to-1.

In this same study, developers were asked to compare IEF maintenance productivity with their former methods. Of those responding, more than 80 percent had experienced gains of from 2-to-1 to 10-to-1. (See chart.)

Specifications always match the executing application.

With the IEF, application changes are made to diagrams, not code. So, for the life of your system, specifications will always match the executing application. The Gartner Group research showed that all IEF users who reported making application changes made all changes at the diagram level.



Developers were asked to compare IEF maintenance to former methods. Of those responding, more than 80% reported productivity gains of from 2-to-1 to 10-to-1.

Mainframe applications can be developed and tested on a PC.

With our new OS/2 toolset, you can develop mainframe applications, from analysis through automatic code generation, on your PC. Then, using the IEF's TP monitor simulator and the diagram-level testing feature, you can also test these mainframe applications without ever leaving the PC.

More environmental independence coming soon—develop on PC, generate for DEC/VMS, TANDEM, UNIX.

The IEF has generated applications for IBM mainframe environments (MVS/DB2 under TSO, IMS/DC, and CICS) since early 1988. Soon you'll be able to develop systems in OS/2 and then automatically generate for other platforms. DEC/VMS, TANDEM and UNIX are scheduled for availability in 1991. More will

follow. We are committed to increased environmental independence in support of the Open Systems concept.

We are committed to standards.

IEF tools and IEF-generated code will comply with standards as they emerge. We will adhere to CUA standards and to the principles of IBM's AD/Cycle and DEC's COHESION—and we will support Open Systems environments centering around UNIX. In any environment, the COBOL, C and SQL we generate adhere closely to ANSI standards. Our presence on standards committees helps us keep abreast of ANSI and ISO developments affecting the CASE world.

Full-service support.

Of course, our technical support, consultancy, training courses, satellite seminars, and other informational assistance will continue apace. We also offer re-engineering and template services. This full-service support will remain an integral part of the IEF product.

For more information call 800-527-3500 or 214-575-4404.

Or write Texas Instruments, 6550 Chase Oaks Blvd., Plano, Texas 75023.

**TEXAS
INSTRUMENTS**

NCR is banking on POS

Wireless system can eliminate need for cabling of networks

BY ELLIS BOOKER
CW STAFF

DAYTON, Ohio — Already a strong presence in the point-of-sale (POS) and automated teller machine (ATM) markets, NCR Corp. recently expanded its investments in both areas.

Early this month, NCR introduced a pint-sized POS system, the 5100 family, which can optionally use NCR's Wavelan wireless local-area network product, which virtually eliminates the need for ca-

bling of networks and peripherals.

The 5100 systems use the Intel Corp. 80386SX 16-MHz platform and measure 11½ by 17 by 6½ in. — about half the space that a standard personal computer would occupy, according to NCR.

Last week, NCR announced a marketing alliance for the 5100 family with Ampersand Corp., a York, Pa.-based bank automation software company with licensed products in more than 12,000 banking locations around the world.

The partners said Boatmen's Banc-

shares in Kansas City, Mo., had become the first customer for the 5100, loaded with Ampersand's Branchbanker and Branchteller software, with an order valued at \$3.6 million. Boatmen's will place the workstations in some 80 locations in St. Louis and Memphis in 1992.

Video-teleconferencing on tap

On the ATM front, NCR said last week that Huntington Bank in Columbus, Ohio, would become the first U.S. bank to add video-teleconferencing to its mix of customer services.

Huntington will use NCR 5682 self-service terminals, which employ AT&T Bell Laboratories technology to transmit both voice and video signals over a standard telephone cable. NCR, the

networked computing resource of AT&T, was acquired by AT&T in September.

Also, NCR announced a \$15.9 million contract last week with Mitsubishi Bank Ltd. of Japan, for 210 NCR 5086-E Super ATMs and 53 NCR 5087 Cash Dispensers. Mitsubishi Bank of Japan, in deposit volume, plans to install the equipment at customer sites throughout Japan.

Taking care of OOP garbage

CONTINUED FROM PAGE 29

Like Wang, many C++ advocates say they do not need automated garbage collectors to keep their objects straight. But C++ programmers must consciously allocate memory to various processes and must also remember to "de-allocate" it as needed.

The usual problem is that developers sometimes forget about "dangling pointers," and the C++ system crashes, said Natasha Krol, a systems analyst at Meta Group, Inc. in Westport, Conn.

MANY "C++ developers spend a fair amount of time worrying about being efficient with the memory they use."

IAN SCHMIDT
OBJECT DESIGN

Just how is this debate over garbage collection going to be resolved? While that is not exactly clear, industry analysts believe that the C++ advocates are going to turn to automatic object "destructors" in C++ to counter what the object "constructors" build up. Some even suggest that a C++ equivalent for the garbage collector is quietly being developed.

"C++ developers spend a fair amount of time worrying about being efficient with the memory they use," explained Ian Schmidt, product marketing manager at Object Design, Inc. in Burlington, Mass.

"The interesting part about garbage collection is the cleverness of the algorithm [that does it] and how quickly it executes," said Rick Dellinger, vice president of software engineering at Parc Place Systems, Inc., in Mountain View, Calif., which sells the Smalltalk 80 language. "The [garbage] collectors themselves do have a mind of their own, but they're simpleminded. They follow a precise set of rules about how they're supposed to behave."

Dellinger teaches Smalltalk 80 programmers how to build garbage collectors of their own at their home IS shops. If a program that tracked stock prices no longer cares about past stock quotes, "then the garbage collector would take them away," he explained. But old stock prices deliberately stored in a data repository would be allowed to stay around, Dellinger noted.

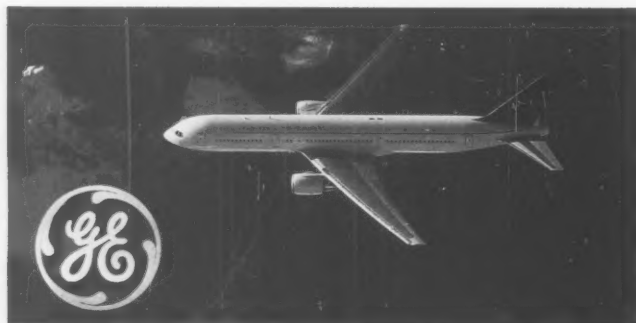
"It's not a question of brains," he said. "It's a question of housekeeping."

It pushes jets past 600 mph and will quickly change the way you lease computers.

The GE engine that powers some of the most advanced planes in the world is a prime example of

the forward thinking that has made GE a leader in the aviation industry. That same type of thinking

has made GE Capital Computer Leasing (formerly Decimus) a leading lessor to Fortune 500



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DIGITAL

DIGITAL UPDATE

THE OPEN ADVANTAGE DECEMBER 1991

New OPEN Software Licensing Gives You Freedom to Choose

Digital has revolutionized software licensing, giving you the freedom to choose among license options, the freedom to buy precisely the amount of software needed, and the freedom to make hardware and software decisions independently.

In the past, the cost of a software license was tied to the size of the hardware on which it ran. This worked to limit your ability to make the most of your computing resources.

Now, Digital has changed all that. Our new user-based licenses liberate software license fees from hardware platforms. This leaves you free to license software in the way that best suits your computing architecture, business requirements, and user community. You pay for what you use — and no more.

Three Flexible Choices

Three types of user-based software licenses are now available, making it easy for you to tailor a license to your situation, whether you need to offer some applications to a few users, some to many users, or some to the entire user community.

The Personal Use License gives a named individual access to a software product.

Personal Use Licenses come in single-user increments. You can buy as many as you need, and add users easily as those needs change. This new approach to licensing assures users access to the tools they need, when they need them — even if there's only one user of a specific software product.

Personal Use Licenses give users and managers unprecedented flexibility. The licenses are redeployable and reassignable. They allow you to run applications on a desktop system, a datacenter machine, or anything in between. Plus, you can reassign a Personal Use License after 30 days.

The Concurrent Use License allows a fixed number of users to share an application.

This license is designed for work groups to share. It's ideal for users who want many of the advantages of a Personal Use License, but don't require assured access for all possible users all the time. The Concurrent Use License specifies how many people can use the software simultaneously. Users are granted access on a first come, first served basis; as one user logs off, another can log on.

Like Personal Use Licenses, Concurrent Use Licenses are granted independent of the size of the processor on which they are running. When you move licenses between processors, you don't need to notify Digital. This means you'll incur no charges, nor will you be burdened by extra administrative tasks.

The Unlimited System Use License allows unrestricted use of an application on a designated system.

The number of users is limited only by the performance of the system. This is the way Digital has licensed software for years — based on the power of the system on which the software is installed.

For some customers, an Unlimited System Use License remains the most cost-effective choice — especially when there is a large user base for one or more major applications, like ALL-IN-1 for example. For software products that provide system-wide capability, such as networking software, the Unlimited System Use License remains your single license option, best reflecting the value your users derive from the software.



How to Take Full Advantage of OPEN Software Licensing

Here are some answers to questions you might have about how to open your computing environments to the benefits of Digital's new user-based software licensing.

How can I upgrade my present license to the new license types?

Digital is offering a trade-up program for many products. The trade-up cost is 15% of the value of the new licenses.

Do I have to upgrade them?

No, it's completely up to you. Digital continues to support all current license types.

What if I upgrade to Personal Use Licenses and then find I have too much software in some places and not enough in others?

You can "bank" licenses for later use. Or, better yet, redeploy a license right away to where it's needed in your organization (within national borders). It's your choice.



more on Software Licensing

Are all three licensing options available for all Digital software products?

No. Right now, we offer Personal Use Licenses for more than 120 products, and Concurrent Use Licenses for more than 85 products. More are being added all the time. Your Digital sales representative can keep you updated, or you can check your next DECdirect software catalog.

How can I know which license is best for a given application?

Your Digital sales representative will work with you to help you understand your options, as well as explain in detail the costs and benefits of each license.

In general, since Personal Use Licenses offer so much flexibility, they may be your best option for most applications. As platforms and requirements change, as groups merge, as people move — in any situation where you need to redeploy people or computers — user-based licenses give you the most flexibility to make the best decisions. As such, they're ideally suited for today's dynamic work environments.

What kind of management tools can Digital provide?

Digital's LMF (License Management Facility) has been enhanced to support every license we offer. LMF provides a tool that allows you to register license information, as well as redeploy, reassign, and upgrade licenses easily.

How will these new licenses affect hardware purchasing decisions?

Significantly. With Personal and Concurrent Use Licenses, hardware and software costs are no longer necessarily tied together, so you can evaluate your hardware and software needs separately. You're free to base your hardware decisions on what platform is best for an application and your software decisions on the needs of the users.

Is this level of flexibility and choice really new?

Yes, it is. No other vendor offers customers a choice. Neither IBM nor Hewlett-Packard offers user-based licenses on their multi-user systems.

While all hardware vendors claim to recognize the need to help customers adapt to integrated, multivendor computing environments, only Digital follows through. We're committed to satisfying this need in a comprehensive way — with open software products, multiplatform services, and leadership business practices.

Now Save 15% on Digital Software Products and Get a FREE Video Too

Contact your Digital sales representative, or call 800-DIGITAL (800-344-4825), ext. 502, for more information on how you can save 15% on Digital software products if you order before February 15, 1992. (Whoever you talk to, be sure and ask for our FREE video on Open Software Licensing.)

**The Open Advantage:
Digital Layered Software vs. the Competition****Investment protection and license options**

	DIGITAL VMS	DIGITAL ULTRIX	IBM MVS	IBM OS/400	ADL	HP VAX/VMS	HP PA-RISC	SUN SUNOS
Cost of adding first user	LOW	LOW	VERY HIGH	HIGH	LOW	HIGH	LOW	LOW
Cost of adding incremental users	LOW	LOW	NO CHARGE	NO CHARGE	LOW	NO CHARGE	LOW	LOW
Software costs resulting from a system upgrade	NO CHARGE	NO CHARGE	VERY HIGH	HIGH	MEDIUM	HIGH	MEDIUM	NO CHARGE
Cost to redeploy software to another system	NO CHARGE	NO CHARGE	VERY HIGH	HIGH	MEDIUM	HIGH	MEDIUM	NO CHARGE

Flexibility of license options

	DIGITAL VMS	DIGITAL ULTRIX	IBM MVS	IBM OS/400	ADL	HP VAX/VMS	HP PA-RISC	SUN SUNOS
Choice of license options	✓	✓	✓					
Pay just for what you need	✓	✓						
Run software on any size system: no charge/no paperwork	✓	✓						✓
Hardware choice decoupled from software choice	✓	✓						✓
Hardware upgrades independent of software upgrades	✓	✓						✓
License management tools	✓	✓						

*IBM offers a monthly lease option on mainframe software.

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Right now, when you purchase Digital hardware services on your current Wang equipment, you're also eligible to receive a FREE Migration Assistance Package for Wang VS COBOL data processing applications and Wang WP and WP Plus word processing documents.

This could be just the solution you're looking for to solve migration path dilemmas. Here's how it works:

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Select from the following operating system platforms:

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Select from the following operating system platforms:

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- RISC ULTRIX
- PC/SCO UNIX
- PC/MS-DOS
- Apple Macintosh.

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- Word processing packages include WordPerfect, Microsoft WORD, WPS-PLUS, DECwrite, MultiMate, and more.

For more information about our FREE Wang Migration Assistance Program, call 800-DEC-INFO (800-332-4636), ext. 595.

NO COMPROMISE Computing

With its October product announcement, Digital positioned VAX VMS systems ahead of the industry's price/performance curve.

William Demmer, Vice President of the VAX VMS Systems and Servers Group, answers your questions about these systems and about the future of VAX VMS.

The new VAX VMS offerings claim to deliver performance comparable to RISC-based systems. Can you give more details?

Yes. The new VAX VMS systems offer better performance than any competitive systems in their class — including RISC systems from IBM and Hewlett-Packard. In fact, the new VAX 6000 Model 610 has faster TPC-A performance than any IBM AS/400 system, any IBM RS/6000 system, or any comparable Hewlett-Packard system tested.

When you use a balanced work load which stresses all the capabilities of a computer — CPU, I/O, memory, disk performance, and software efficiency — the new VAX VMS systems excel. The VAX 4000 Model 500 tests at 62.4 tpsA-Local and the VAX 6000 Model 610 achieves 83.6 tpsA-Local.*

What about price/performance?

The VAX 4000 and VAX 6000 systems are rated number one and number two in price/performance measured by the open, audited TPC benchmark A. VAX VMS systems now deliver better price/performance than RISC-based systems from Hewlett-Packard and IBM in full systems applications — \$11,945/tps-A for the VAX 4000

Model 500 and \$12,922/tps-A for the VAX 6000, Model 600. Digital customers don't have to choose among price/performance, functionality, or openness. You get it all. It's what I like to call "No Compromise Computing."

Digital also announced two new VAXstation systems. What do they offer?

Both the VAXstation 4000 Model 60 and the VAXstation VLC dramatically improve performance and price/performance.

In fact, we reduced the entry price for a VAX workstation to PC levels — \$3,450. This makes the VLC the industry's lowest priced workstation.

Both models offer high-performance 2D graphics as an integral part of the base system — at no additional cost.

Digital designed these desktop workstations with the user in mind. The VLC's low profile requires minimal desktop space. And both models have snap together packaging to

"Digital customers

don't have to choose

among price/performance,

functionality, or openness.

You get it all."

allow the user to easily add disks and memory as needed. No compromise on the desktop!

All these numbers are very impressive but isn't performance and price/performance a leapfrog game? Can Digital stay ahead?

Yes, we can — for two reasons.

The first reason, of course, is the VMS operating system. You don't have to give up the robust VMS software environment to get the functionality and reliability associated with mainframes. It's the best of both worlds — at a fraction of the cost.

The VMS environment is the most complete on the market, with the easiest to use software, the best development tools, the most complete networking, and the most flexible growth path. And VMS software is the best in the industry when it comes to ensuring that data is protected and always available.

And the second reason?

That's our CMOS technology. The new CPUs operate at 83 MHz, faster than competitive RISC chips from HP, IBM, Intel, and Sun. In fact, Digital has a three-year track record of the fastest microprocessor silicon in the industry. (See chart below.)

Leadership in semiconductor design and manufacturing is the heart of the outstanding performance of these new VAX systems. And this base strength is the firm foundation upon which we are building the RISC VMS systems now in development.

RISC technology combined with the investment protection Digital has always provided — meaning upgrade and replacement options — will make for a very smooth migration. This will be especially true in this case, since most of today's peripherals — the largest part of a system investment — will be supported on the new RISC systems.

So where is Digital heading with the new VAX technology?

VAX VMS has always been leadership technology. With our new 64-bit RISC systems, I think you will see Digital setting the industry standard for performance, price/performance, open technology, and functionality well through the next decade.

In fact, I think the introduction of the new RISC systems will be the easiest architectural transition the industry has ever experienced.

*tpsA-Local performance results reported to Transaction Processing Performance Council as of October 28, 1991.

On the semiconductor leadership track: Digital has led the industry with the fastest microprocessor silicon.

Year	Competitive RISC	VAX
1989	33 MHz	35 MHz
1990	40 MHz	62 MHz
1991	67 MHz	83 MHz



Catch the Latest News with the Electronic Connection

Sure, Digital's Electronic Connection is a convenient way to purchase products online. But did you also know that it's a great place to find the most current, detailed information on newly announced Digital products and programs — everything from product strategies to part numbers.

To log in to the Electronic Connection, dial 800-234-1998 at 1200 to 9600 baud, from any Digital-compatible terminal or PC.

If you don't already have an account established with the Electronic Connection, you can get one just by dialing in. Follow the on-screen instructions to register for a temporary account. The Electronic Connection will then use this information to register you for a permanent account, and within two weeks you'll receive a detailed "welcome" kit customized with your own Electronic Connection password.

Digital's Self-Maintenance Support Means Multivendor Support

If you're a self-maintenance customer, you can now get Digital's world-class support for a wide range of office and network products that were manufactured by other companies. We support many of the most popular office and network products and are continually adding to the menu.

This support includes sales of spare parts and repair offerings such as DECmail and Factory Express. You can even include many of your non-Digital office and network products under your CSA (Campus Service Agreement) and DASP (Digital Assisted Services Program) agreements.

For more information, please contact your local Digital sales representative, or call 800-225-5385.

Save 15% on New DBA Performance Package

As an introductory offer, Digital's Database Administrator's (DBA) Performance Package is available at 15% off the regular price now through January 31, 1992.

The DBA Performance Package is unique in that it provides a full complement of tools needed to design, tune, implement, and maintain an Rdb database. It contains DEC RdbExpert, DECtrace, and the Rdb Interactive License.

Call 800-DIGITAL (800-344-4825) for more complete ordering information.

6 Ways to Save Time, Paper, and Money

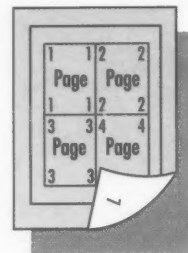
Digital's network printing software offers you the opportunity to take maximum advantage of Digital printers running in a VAX VMS environment — with benefits you can count on.

Did you know that:

1 You, or your application, can send a print job from your node in Chicago and have it start printing from one or several other nodes anywhere in your worldwide network. And you can monitor the progress of that print job from your node or from the nodes where the printing is being done. You do this with software called VAX Distributed Queuing Services (DQS).

2 You don't need a PostScript printer to print a PostScript file. You can convert the file and print it on most Digital ANSI (Sixel) printers that are on a VMS queue or attached to your VT terminal or PC terminal emulator port. This means you can achieve the full power of PostScript text and graphics on Digital's LA, LJ, and LN series of printers. You can even get full color when you're using an ANSI color printer like the LJ250. To do this, you run the DECprint Utility for PostScript to Sixel Printing from your VMS host.

3 Most Fortune 1000 companies would save a small forest worth of paper by "laying up" printouts of draft documents and electronic mail. Lay-up (or number-up) allows you to print two or more page images on a single sheet of paper. When you do this on high-resolution PostScript printers (like our DECtaser and PrintServer printers), the



Printing Is Much More than Printers

DECprint Printing Services for VMS provides lay-up and duplex capabilities, so not only do you have flexibility in how you print documents but you also conserve paper. This lay-up sample shows four page images printed on one side of a single sheet of paper.

result is highly legible and makes for comfortable reading — even with page images as dense as 132 columns by 66 lines. Lay-up also enables you to offset page images so that bindings and hole-punches don't obscure the text.

4 An even larger forest can be saved by printing on both sides of a sheet of paper — which many Digital laser printers can do. This is called duplex printing.

5 We're not done saving yet! Consider that these conservation methods use far less of your other printer consumables — and cause fewer sheets to pass through the printer. This adds up to increased savings, as well as a much longer life for your printer engine.

6 Lay-up and duplex are but two of the features brought to you by the network printing product called DECprint Printing Services for VMS. Another feature gives PC and Macintosh clients access to VMS and network-based printers. Yet another feature translates various printing protocols for printing to PostScript printers. These protocols include HP-PCL-Level 4, TEKTRONIX 4010/4014, ANSI/PPL3 (Sixel), DDIF Bitonal, and ReGIS. Furthermore, these features can be independent of, or integrated with, printing applications. The license to operate this powerful software is included with many of Digital's PostScript laser printers and is also available separately.

For more information on the network printing software available to help you cost-efficiently maximize your Digital printers' capabilities, contact your Digital sales representative. Or call 800-DIGITAL (800-344-4825), ext. 474.

MORE FONTS... and More Flexible Ways to Use Them

Digital's expanded DECfonts Typeface Collection now offers you a wide range of Adobe Type 1 scalable typefaces in a choice of 29 font kits. Over 150 typefaces are available with this new release — and all fonts are compatible with all Digital Adobe PostScript-compatible printers and DECwindows.

With so many unique fonts to choose from, you'll find it's suddenly easy to produce creative, professional-looking, and attention-getting documents. DECfonts typefaces make your PostScript-compatible printer the most flexible, functional printer available today.

Unique Font Licensing Policies Open Network Printing Environments

DECfonts Typeface Collection changes the way typefaces are licensed, providing expanded opportunities to use Adobe fonts in networked environments.

Previously, you could print documents containing scalable fonts only on printers containing those fonts and licensed to use them. Now, you can actually see and manipulate the fonts on your terminal or workstation, and then print your document on the PostScript-compatible printer of your choice.

Using fonts from the DECfonts Typeface Collection, you can design a document with an application such as DECwrite, then mail it to whomever needs to read it, or mail it for printing on any PostScript-compatible printer — without worrying about whether fonts are built-in or licensed to the printer.

This licensing approach provides the same capability that you have with paper distribution: Instead of making paper copies and distributing them to your associates, you can produce and mail a docu-

ment electronically. As an added bonus, the quality of your document design is preserved since no photocopying is involved.

No other vendor can offer you the functionality, full Adobe PostScript compatibility, and attractive licensing features that come with Digital's exclusive growing library of typefaces — the DECfonts Typeface Collection.

For more information on the DECfonts Typeface Collection, contact your Digital sales representative. Or call 800-DIGITAL (800-344-4825), ext. 526. (And keep in mind that all DECfonts Typeface Collection products qualify for Digital's software pricing discounts.)

Every font you'd want comes with the new, improved DECfonts Typeface Collection:

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4	ITC Avant Garde Gothic® Condensed
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5	Bodoni
3	Century Old Style
4	Decorative
5	Folio®
9	Frutiger®
6	Futura® 1
6	Futura 2
8	Futura Condensed
6	Adobe Garamond®
4	ITC Garamond®
6	Gill Sans® 1
5	Gill Sans 2
7	Headline #1
6	Headline #2
5	Headline #3
4	Helvetica® Black/Light
3	Helvetica Condensed
3	Helvetica Compressed
3	Helvetica Condensed
14	LaserWriter® Emulation
14	News #1
10	Office #1
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NEW PRODUCTS — SOFTWARE

Applications packages

Axis Computer Systems, Inc. has announced Release 6.0 of the Axiom Accounts Payable module.

Axiom is the company's manufacturing resource planning (MRP II) software package for Digital Equipment Corp. VAX/VMS, Ultrix and The Santa Cruz Operation's SCO Unix systems. The updated Accounts Payable module includes vendor account inquiries, check inquiries and automatic invoice holds.

Pricing ranges from \$8,000 to \$35,000, depending on configuration.

Axis Computer Systems
65 Boston Post Road
Marlboro, Mass. 01752
(508) 481-9600

Unix software

Procase Corp. has announced the availability of Smartsystem Release 2.0.

Smartsystem is a set of software engineering tools for C language programmers on Unix workstations. Release 2.0 gives users new metrics for measuring the size and complexity of software projects. It also offers enhanced interaction with external tools from other firms.

Smartsystem includes five modules as well as the metrics add-on package for \$2,000 each.

Procase
Suite 100
3130 De La Cruz Blvd.
Santa Clara, Calif. 95054
(408) 727-0714

Utilities

Avtech Software, Inc. has created Sniper, a software package for Digital Equipment Corp. VAX systems.

Sniper monitors disk space and manages idle processes. In the case of a process that has been left idle, Sniper notifies the systems manager or terminates the process, freeing up system resources.

Pricing ranges from \$495 to \$1,095.

Avtech Software
Suite 500
19800 MacArthur Blvd.
Irvine, Calif. 92715
(714) 957-1978

Landmark Systems Corp. has unveiled an upgrade of The Monitor for DB2.

Enhancements in Release 1.1 include a menu-driven data trace facility for performance tuning and customized reporting. A prototyping "Explain" facility and 12 new sample reports have also been added.

Prices range from \$18,000 to \$34,000 per central processor.

Landmark Systems
8000 Towers Crescent Drive
Vienna, Va. 22182
(703) 893-9139

Executive Software, Inc. has announced Version 5.0 of Diskeeper/Plus.

The product is a disk defragmentation utility for Digital Equipment Corp. VAX systems. Enhancements include full use of the VMS Version 5.5 file system and a server process architecture.

Pricing ranges from \$250 to \$10,600.

Executive Software
701 N. Brand Blvd.
Glendale, Calif. 91203
(818) 547-2050

System software

NCube Corp. has announced the NCube Parallel Software Environment (PSE), a Unix-based development system for the company's NCube 2 line of massively parallel supercomputers.

The NCube PSE is based on industry-standard Unix and includes programming tools, libraries and compilers for adapting Unix programs for the NCube 2 systems.

Pricing starts at \$30,000.

NCube
919 E. Hillsdale Blvd.
Foster City, Calif. 94404
(415) 593-9000

Data storage

The Flash8mm VMS backup management system has been announced by Winchester Systems, Inc.

The subsystem offers up to 20G bytes of compressed storage per tape. It incorporates the company's dynamic tape accelerator technology for streaming backup, as well as a tape librarian function and an LCD function display.

Pricing starts at \$6,495.

Winchester Systems
400 West Cummings Park
Woburn, Mass. 01801
(617) 933-8500

I/O devices

Visual Technology, Inc. has developed the TX100M, a 14-in. monochrome X terminal priced at \$995.

The TX100M offers a noninterlaced monitor with dual-screen resolutions: 1,024 by 768 pixels at 62Hz and 864 by 648 pixels at 72Hz. It also includes 2M bytes of memory expandable to 10M bytes. Software bundled with the TX100M includes a version of Transmission Control Protocol/Internet Protocol optimized for the X Window System.

Visual Technology
120 Flanders Road
Westboro, Mass. 01581
(508) 836-4400

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► Purita Isaacson, Ph.D., Dream Machine
► Andrew Seyfield, Entaguest
► Bill Lempeas, The Lempeas Report/Pen Vision News

► Tim Rajariv, Creative Strategies Research International
► Peter Tinge, Infocorp
► Bruce Stophen, International Data Corporation

Other industry experts will speak including John Rizzo of Monetta, Pradeep Singh of Microsoft, Chuck Emis of TelePad, Jeff Hawkins of GRI, David Fox of Nestex, and Harry Garhart of OCR Systems.

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► Pen Computing's Return on Investment
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► Handwriting Recognition Applications

► Pen-Top Computers
► Wireless Communication via Handheld Pen Systems
► Palmtop Computers and Pens

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*Pen Vision News/Lempeas Report

Federal Computer Week is the official government publication of the Pen Computer Users Conference.

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Paying again and again for virus protection is enough to make you ill.



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Only Untouchable Network gives you centralized virus protection.

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recognize and obliterate hundreds of the little buggers — enough to protect you from 95% of the potential carnage.

If you find that statistic reassuring, then you probably like the odds in Russian Roulette.

If you don't, you'll want to

know that Untouchable is equipped with a unique *third* line of defense, which has been mathematically proven to be, well, untouchable.

Instead of looking for viruses, this third line of defense looks for *changes in your executable and system files.*

If the change is but a single byte, Untouchable will spot it and, using our patent-pending recovery technique, reconstruct the file to its original state.

The process is known as Generic Differential Detection, and certain other programs claim to perform it, too.

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PCs & WORKSTATIONS

PC & WORKSTATION SHORTS

HP, Z-Nix make pact

Hewlett-Packard Co. and Z-Nix Co. announced a bundling agreement that will see HP's New Wave Desktop Manager for Windows packaged with Z-Nix's Cordless Super Mouse. The product is expected to be priced at \$375.

Parlance Publisher 4.0 is shipping immediately, according to Xyvision, Inc., the Wakefield, Mass.-based maker of the open systems desktop publishing tool. Enhancements include the ability to run Parlance from personal computers and Apple Computer, Inc. Macintoshes that support X Windows from an Open Software Foundation Motif-based interface, enhanced Postscript support and color preview and output capabilities.

Aldus Corp. announced the shipment of Aldus Pagemaker Database Edition, which links Aldus users to database management systems via Pagehead, developed by Pagehead Software Corp. Users will be able to query, retrieve and format database files and move them into Pagemaker files, the firm said.

Bug fix fallout still lingering

ANALYSIS

BY CHRISTOPHER LINDQUIST
CW STAFF

It was a bad year for products from personal computer utilities software vendors. Both Central Point Software, Inc. and Symantec Corp. released maintenance updates — what used to be called "bug fixes" — for their flagship products.

However, while users of Symantec's Norton Utilities reported little need for the update, Central Point may face a battle in getting some users to reinstall PC Tools.

Central Point's PC Tools Version 7 was hit with problems almost immediately after its release in May.

Conflicts with hardware and software as well as problems running such features as the Commute remote access package caused many users who once regarded Central Point's prod-

Bug exterminators

Both PC Tools and Norton Utilities faced problems that required the quick release of a maintenance upgrade:

PC Tools Version 7 problems:

- Incompatibility with hardware and software, including some video cards.
- Improperly working features such as disk rejection during backups.
- Problems with Commute remote access package.

Norton Utilities Version 6 problems:

- Problems with Ncache software compatibility.
- Erase Protect would not manually purge properly.
- False "memory allocation exceeded..." error message would appear on some systems.

CW Chart: Janell Genovese

ucts with respect to quickly remove PC Tools Version 7 from their drives.

"I had to pull hundreds of

copies off," said Ron Kosar, enterprise network manager at Martin Marietta Corp.'s Aero & Naval Division.

Kosar reported that the product had caused data loss by destroying file-allocation tables and had "clobbered whole networks."

Norton Utilities' troubles apparently affected fewer users. Fixes that were supplied with the August release of a maintenance upgrade, Version 6.01 of Norton Utilities, included solutions for a variety of problems with the Ncache disk-caching program and the removal of a memory-related false error message.

George Roukas, systems director at a Fortune 50 financial services company, has long been

a user of both products and agreed that PC Tools had far more serious problems than Norton Utilities.

"I haven't been using PC Tools since [Version] 7 came out," he said. Roukas claimed he had one of his staff members spend two days trying to get the Commute feature to work correctly — without success.

Roukas did receive the maintenance upgrade, Version 7.1, from Central Point, but he said he has no plans to install it. He said Norton Utilities in combination with Norton Desktop for Windows gives him all the functionality he needs, so "I just decided to take [PC Tools] off."

Roukas and other users had no similar tales to tell concerning Norton Utilities Version 6.

While both companies claim the updates solve the most serious user problems, several users on electronic bulletin boards have reported that serious bugs with the PC Tools Backup utility still exist. A spokeswoman for Central Point indicated the company had not received any such reports.

OS/2 aids utility's record-keeping

BY ROSEMARY HAMILTON
CW STAFF

The Arizona Public Service Co. recently installed an IBM OS/2-based employee identification system that will help it keep tabs on the thousands of contractors who work at the organization's three nuclear power plants.

The system will replace separate software and manual systems that kept information — including employment history and

drug-test results — on contractors. Arizona Public Service operates the Palo Verde nuclear-generating stations.

The new system will also allow the company to issue badges at various security checkpoints.

"Prior to this, we had a number of stand-alone-type systems: from [keeping information on] yellow legal pads to mainframe systems," said Stephen Lightfoot, supervisor of distributed system development.

So far, six OS/2 workstations, running on IBM Personal System/2s and clones, have been installed. The OS/2 systems can access employee data on either the OS/2 Database Manager or a host database.

One workstation is running the Edicon Management System from Eastman Kodak Co.'s Edicon Systems Division under OS/2, which can assemble the information required to be displayed on a badge and then pro-

duce the badge.

A workstation user will be able to call up a complete package of information about a contractor before he can enter the facility. This data, which resided in numerous systems, is being poured into IBM's DB2.

OS/2 was selected because "we were really attracted to the reliability of it," Lightfoot said. "We didn't want to have a lot of administrative support for this group." Lightfoot, currently running Release 1.3, said he hopes to move to the much-anticipated Release 2.0 next year.

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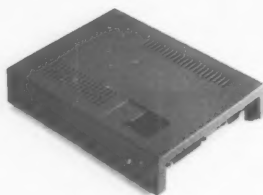
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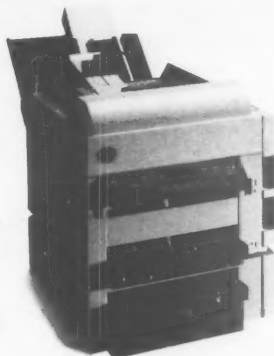
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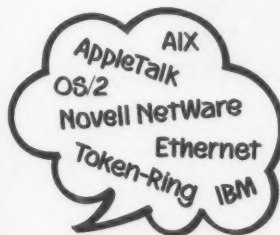
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 - D. End-user of IS Equipment
 - E. No Involvement

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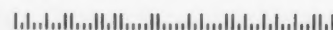
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Users eager for Apple/Borland database

But they want multiplatform support and a Mac interface, not just another version of Paradox

BY JAMES DALY
CW STAFF

The news that Apple Computer, Inc. and Borland International, Inc. are jointly developing a database has been greeted warmly by users struggling to bridge interoperability gaps inherent in many multiplatform environments.

"We run from single-platform products — it's got to be multiplatform, or we don't even look at it," said Steve Bergfeld, manager of computing standards at Martin Marietta Corp. in Chantilly, Va. Many users also said Borland's move will help Apple penetrate the corporate market.

Borland President Philippe Kahn's announcement of the col-

laborative effort at a recent meeting of the Boston Computer Society surprised many Apple users, who have long clamored for a Macintosh version of Borland's Paradox database, which is only available for the DOS platform. Although the joint effort is still in its early stages and no arrival date has been mentioned, Borland officials said it is unlikely to be a straight port of Paradox. "We don't want to just fiddle around and do a port — we want to do something important," said Rob Dickerson, vice president of the database division at Borland.

That is good news for users in multiplatform shops. "We're real excited about the news," said Rick Marolt, information

systems manager at Great Central Insurance Co. in Peoria, Ill. Marolt said he is hoping to tie the Macintosh into a Novell, Inc. Netware environment running IBM Personal Computer clones and is looking for a database that can span both platforms.

No first-timer

The upcoming product will not be the first time that Borland has made a move in the Macintosh marketplace. In late 1987, the companies jointly developed and marketed Borland's Reflex Plus, a \$279 relational database. Reflex Plus later died on the vine when Borland focused its energies on the larger and more lucrative DOS and Microsoft Corp. Windows market.

Why the change? "The Macintosh is a far more capable platform than it was a few years ago," Dickerson said. "The connectivity is there, the hardware is there, the throughput is there." Apple has also enjoyed renewed corporate respectability through its recent pact with IBM to build a new object-based operating system.

Borland will have its work cut out for it because the Macintosh database market already contains firmly entrenched competitors. Other products, such as Acus, Inc.'s Fourth Dimension; Fox Software, Inc.'s Foxbase; Odesta Corp.'s Double Helix; Blythe Software, Inc.'s Omnis 5; and Claris Corp.'s Filemaker, are well-established. Additionally,

AEC Software in Sterling, Va., is expected to come out with its Filepower object-oriented database early next year.

Users say a Borland database for the Macintosh could score big if it addressed several key areas, such as the following:

- Take advantage of the graphical aspects of the Macintosh interface.
- Provide connectivity to Paradox for DOS and Paradox for Windows, which is expected in the first half of next year. Also, provide links to Borland's other products.
- Provide a feature similar to SQL Link, a Paradox Version 3.5 companion product that allows users to access remote SQL data without learning complex SQL programming.
- Leverage client/server connectivity to Borland's Interbase, which offers a relational database management system for multiuser environments.

Infection risk not spurring use of antivirus software

BY MICHAEL ALEXANDER
CW STAFF

Despite the growing concern over computer viruses, many end users are waiting until they have been zapped by an infection before buying antivirus software.

"Why don't they install and use antivirus software?" asked Greg Bourlotos, who manages the networks and personal computers at Blue Cross/Blue Shield of New York in Albany. "They are probably like us: We said, 'We'll deal with it when it comes up.'"

Last August, the problem came up. About 80 PCs in the finance department were socked with two versions of the Dark Avenger, a particularly malicious virus designed to destroy files. It took three technicians, working 20 hours at a time, three days to eradicate the virus. The tab for the clean-up effort and machine downtime is still being calculated but will undoubtedly run into several thousands of dollars, Bourlotos said.

"You really don't know what you're in for until it happens," Bourlotos said.

With some 1,000 viruses known to exist and two to three introduced every day, it is no longer a matter of if, but when a virus will infect a company's PCs, according to the National Computer Security Association (NCSA). The number of North American companies and government agencies that have been hit with a virus is doubling every four to five months, according to a study released late last month [CW, Dec. 2].

Little interest

The NCSA also reported that only 15% of 600 organizations surveyed reported having purchased antivirus software.

The lack of interest in antivirus software can be attributed to the notion that the cure can be nearly as bad as the disease, some end users said.

Blue Cross/Blue Shield now plans to buy 3,000 copies of Certus International's Novi antivirus software package, but

"finding the resources to get them out there is a problem," Bourlotos said.

Also, the rate at which new viruses are being introduced

techniques used by popular protection programs. To combat the problem means having to constantly upgrade software. "Antivirus software demands

Belisle advocated limiting the installation of antivirus software to high-risk systems that may be used by a wide variety of unsupervised users and to systems with high strategic value to the company. Elsewhere in the company, "I place heavy emphasis on access control," Belisle said.

"Access control is an obviously reasonable solution," said Robert Jacobson, president of International Security Technology, Inc., which markets the Virus-Pro antivirus package. "The downside is that it creates problems for the user of the PC by adding to the expense, complexity, maintenance, training and so on."

The majority of antivirus products have four or five ways to protect against viruses, said Tori Case, product manager at Central Point Software, Inc., which markets Central Point Anti-Virus. Antivirus software is able to detect unknown or new viruses by monitoring attempts by programs to terminate and stay resident, alter files in inexplicable ways and other techniques. "They may never upgrade and still be protected," Case said.

Preventive medicine

All 600 companies surveyed had antivirus software installed

Antivirus software	Percent of sites with vendor's product*	Average number of licenses installed per site	Average number of licenses per site installed to automatically protect
McAfee Scan	27%	301	202
IBM Anti Virus	9%	209	116
HJC Virex-PC	5%	145	145
Certus Novi	1%	175	139
Norton Antivirus	21%	28	20
Central Point Anti-virus	18%	9	7
Dr. Solomon's	1%	2	1
Other	11%	124	131

*Not all respondents answered question. Total does not equal 100%.

Source: Dataquest, Inc.

CW Chart: Janet Genovese

means that today's virus detection package is only as good as yesterday's virus. Some of the newer viruses have been specifically designed to circumvent

perpetual maintenance to be effective," said Albert Belisle, deputy director of corporate information security at Bank of Boston.

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Pagemaker: Strong layout, easy to use

Technology Analysis — A roundup of expert opinions about new products. Summaries written by New Products Writer Derek Slater.

Reviewers crown Aldus Corp.'s Pagemaker 4.0 king of the desktop publishing mountain for every area except long documents. Pagemaker 4.0 for personal computers runs under Microsoft Corp.'s Windows environment and offers intuitive access to powerful features.

Ease of use: Reviewers said Aldus' product offers a simple menu structure that provides many options.

Output: Pagemaker includes Pantone color matching for precise color output on-screen and on paper.

Import/export: Graphics and text file support is adequate. Inconveniently, though, all formats must be specified during installation.

Tools: Unlike its competitors, Pagemaker lets users work with a "pasteboard" rather than frames. Version 4.0 adds a miniature word processor and spell checker. Users can rotate text — but not graphics — 90 degrees at a time. Long-document handling is improved but still not outstanding.

Value: Pagemaker 4.0 for Windows costs \$795. Reviewers agreed its combination of strong layout tools and ease of use make it the best value among high-end packages.

Aldus' Pagemaker for Windows

Reviews	Ease of use	Output	Import/export	Tools	Value	Overall
PC Week 7/22/91	Most flexible interface	Professional-looking	Does the best job	Changes are easier to make	Best for generalist	Analysts' choice
Computer Buying World 6/91	NC	Near photo-quality graphics	Expanded graphics capability	Story Editor makes it easy	Better for short documents	Best for Windows
PC Computing 3/91	Intuitive	Lets you do more with color	Mac and PC can exchange files	Hard to create bullets, drop caps	Consider system resources	Capable, compatible
Users						
Tom Ray, Mead School & Office Products Division	■	■	■	■	■	Pretty good, could be better
John Logan, Digital Image	■	■	■	■	■	Very, very solid
IS professional, Major consumer products company	■	■	■	■	■	Easy for a work group to use
Analysts						
Lel Somagyl, Pyscomp	■	■	■	■	■	Pagemaker has begun to shine
Deborah Hess, Datapro Research Corp.	■	■	■	■	■	Identical to Macintosh version
Wayne Yarrco, Yacco Communications	■	■	■	■	■	Very good midrange product

Key: ■ Very good ■ Good ■ Fair ■ Poor Reviewer evaluations are excerpts from articles. Refer to actual reviews for details. User and analyst ratings are based on telephone survey. NC: No comment.

Vendor financial information

Aldus Corp., based in Seattle, reported third-quarter 1991 revenue of \$40.3 million, a 10% increase over \$36.7 million for the same period a year ago. Net income was \$5.5 million, compared to \$6.6 million for the same period in 1990. Sluggish economic conditions and weakness in certain European markets were cited as reasons for the decline in earnings.

Aldus responds

Lori Birtley, product marketing manager:

Tools: We've improved long-document handling dramatically. The feature that's missing from Pagemaker is automatic numbering of sections, figures and paragraphs, but we think customers can use scripting to do the same thing.

Import/export: You don't have to install your file formats line by line; you can just select "All."

Microsoft's Publisher meets laymen's needs

Microsoft's Publisher

Reviews	Ease of use	Output	Import/export	Tools	Value	Overall
Infoworld 9/16/91	Excellent	Pretty slick effects	NC	Page Wizards cannot replace style sheets	Credible solution	Entry level
PC Magazine 11/26/91	Most powerful	Superior printout support	NC	Some novel extras	The middle ground	Ideal for occasional project
PC Computing 10/91	Powerhouse features	Good-looking documents	Imports all the usual formats	Key draw is Page Wizards	Excellent low-budget introduction	Surprisingly powerful
Users						
Brian West, A.G. West Oil, Inc.	■	■	■	■	■	Very easy to use
Charles Branton, Otero Land & Title	■	■	■	■	■	Windows desktop publisher of choice
Misty Baker, Baker Associates	■	■	■	■	■	Easiest publisher in market
Analysts						
Peter Francis, Dataquest, Inc.	■	■	■	■	■	Aimed at the correct market
Walter Miao, Link Corp.	■	■	■	■	■	Excellent introductory package
David Gerder, Seybold Publications, Inc.	■	■	■	■	■	Great for simple, nonprofessional jobs

Key: ■ Very good ■ Good ■ Fair ■ Poor Reviewer evaluations are excerpts from articles. Refer to actual reviews for details. User and analyst ratings are based on telephone survey. NC: No comment.

Vendor financial ratings

Analysts	Short-term performance	Long-term stability
Peter Rogers, Robertson, Stephens & Co.	■	■
W. Christopher Mortenson, Alex. Brown & Sons, Inc.	■	■

Microsoft Corp., based in Redmond, Wash., reported 1991 revenue of \$880.5 million, a 57% increase over 1990, and profit of \$144 million, a 64% increase over 1990.

Microsoft responds

David Perry, product manager:

Ease of use: We plan to create more and smarter Page Wizards to automate new functions, and we're toying with opening it up to third parties.

Tools: There are a lot of people who say, "It would be great to do X and Y," but we need to evaluate whether new tools are useful to the general market. We'll continue to focus more on ease of use.

Microsoft Corp. jumps into the desktop publishing arena with Publisher. Reviewers said that while Publisher is a low-end package that lacks some of the typographic and layout controls of bigger players such as Pagemaker, it also costs a lot less and offers a respectable collection of features.

Ease of use: A key element of Publisher is its Page Wizards, which automate document creation and some document elements, such as curve-hugging text. Page Wizards make it easy for the layman to create attractive documents. Reviewers agreed that Publisher is not exceptionally flexible, though.

Output: Users should be able to produce "jazzy" newsletters and other short documents, according to Infoworld.

Import/export: Publisher handles most common text and graphics file formats.

Tools: The package includes a spell checker and an automatic hyphenation tool for handling text. It also offers alignment grids, black-and-white clip art and snappy border art for framing documents and text boxes.

Value: Publisher costs \$199. Professional publishers will need to look elsewhere, but reviewers found Publisher a great value for those users who need to create nice-looking pages quickly.

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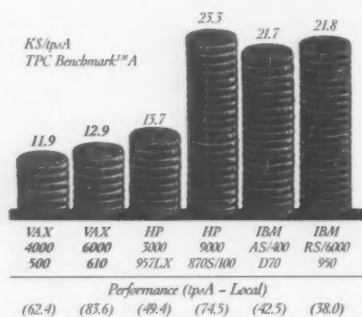
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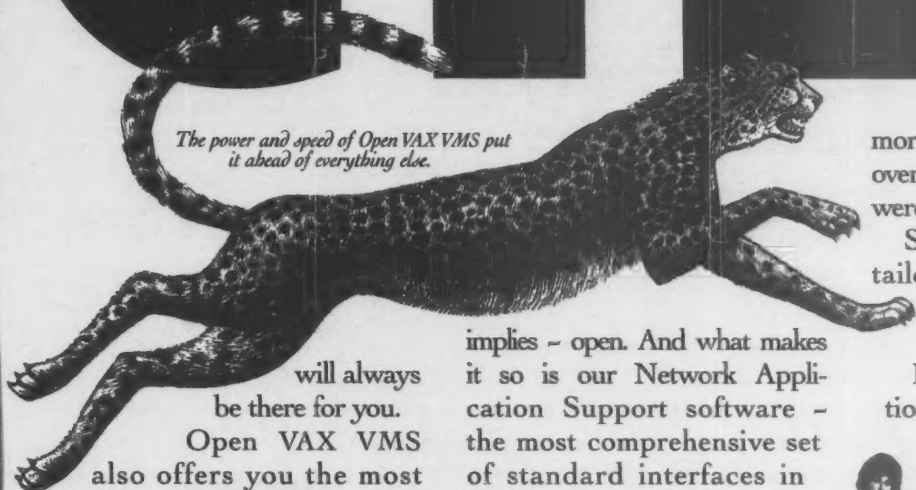
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COMMENTARY

Jesse Berst

Outsourcing your GUI support



If you are moving to a graphical user interface (GUI) such as Microsoft Windows or OS/2, support is undoubtedly one of your top concerns.

More and more IS departments are getting outside help for this problem.

"In the last six months, demand for Windows outsourcing has been beyond anything we've experienced in the previous two years," says Julie Eddy, a support engineer at Corporate Software. Because it was part of an early pilot program, Corporate Software has amassed a lot of Windows experience. The Canton, Mass., reseller has set up support programs in many different flavors, ranging from simple telephone support of shrink-wrapped applications all the way up to acting as an off-site help desk, with a full-time support staff dedicated to one client.

Why so much interest in outsourcing Windows support? The GUI environment is "more complex than DOS," explains David Gusman, who points to memory management and networking issues that

don't exist in the character world. Gusman is a systems officer at Society Corp., a \$15 billion bank holding company based in Cleveland.

Society was an early Windows and OS/2 adopter and now puts a GUI on virtually every new machine it buys. Gusman says he thinks the extra complexity of the GUI is worth it. "There's more difficulty in owning and maintaining your own car than in taking the bus. But you can go a lot more places in the car."

Still, a study by the Gartner Group, a Stamford, Conn., consulting and research firm, predicts that technical support will become more critical in the 1990s, yet the head count will remain flat. One solution to this dilemma, the study suggests, is increased outsourcing.

In Society's case, outsourcing provides a backup to the firm's internal help desk. Other companies are going even further down the outsourcing road. Many companies are hiring consultants not just to develop GUI applications but to support them afterward.

In my research, I've come across two large companies that were signing contracts for the ultimate form of outsourcing: turning your own people over to an outside supplier. The vendor then re-trains those people in the new environment. This approach guarantees that the support vendor will have people on board who know your business and its special needs.

Outsourcing can have two key benefits. First, it can help you through a temporary support crunch. When you make

the move to a GUI, your staff will have to support all the old applications while simultaneously learning the new environment. Outsourcing to an experienced organization in the early stages can make the transition much smoother.

Second, outsourcing can help you get more work done with a small nucleus of people. You can focus your resources on your core business, while outside support specialists worry about staying up with changing technology.

But outsourcing is not a cure-all. For instance, it's unlikely to save you much money. It's better to think of it as a way of getting more out of the same investment. Indeed, outsourcing can even bring along problems of its own.

For one thing, support vendors don't necessarily "understand your business and your culture. They may not know your focus, your goals and your priorities," says Bill Kirwin, vice president of the Gartner Group. "But the most basic mistake," he continues, "is to sign a contract and assume that you've washed your hands of the problem. Even in the best of situations, outsourcing only does away with 70% of the problem. The remaining 30% is coordinating and managing the support." That coordination must stay in-house, he says.

What's the safest way to outsource? Gusman says it's step-by-step, one piece at a time. "Select certain activities, not the entire support operation," he counsels. "Good outsourcing candidates include training, support of custom applications and temporary transitions." Then you've got to "pick an experienced vendor who can get you through that initial learning curve and provide the higher level technical support," he says. "All the vendors on our preferred list have earned their places. Start with small orders and make them prove themselves."

How do you find experienced vendors? When Windows was new, that was a tough challenge. Today, almost all the national companies have substantial Windows support programs, as well as many of the regional players and smaller shops.

So don't think you have to face Windows or OS/2 alone. Now that the world is going GUI, you shouldn't have much trouble finding expertise for hire. With careful shopping and smart management, outsourcing support can ease your transition to a new environment.

Berst is the publisher of Redmond, Wash.-based "Windows Watcher" newsletter, a monthly briefing service for software executives and corporate technology managers.

Next strikes government fancy

BY GARY H. ANTHERS
CW STAFF

RESTON, Va. — Although Next, Inc.'s workstations have been criticized for costing too much money and having too little available software, the vendor is finding support in a surprising area — budget-conscious government agencies.

The city of Baltimore is scrapping the IBM System/36 and dumb terminals it uses for budget preparation in favor of a network of Next workstations. Four have been installed with 22 more on order, and already they are helping budget analysts with their spreadsheet, database, financial modeling, presentation and electronic-mail chores.

Tim Krus, fiscal research analysis supervisor for the city and an attendee at Next's recent Federal Expo here, said he picked Next over a number of alternatives including IBM Application System/400s, IBM RISC System/6000s, networked personal computers and Apple Computer, Inc. Macintoshes. "Next was the only place we could go to get all the functionality we needed on one platform. The whole vision really does come together. It's just an incredible tool to get the job done," Krus said.

Government users at the Federal Expo said the ebony workstations are price-competitive with Unix workstations and have more productive object-oriented software development facilities.

Krus said his budget analysts work in teams, sometimes at odd hours, and Next enables collaboration under those circumstances. He said an analyst can run a financial model using Lotus Development Corp.'s Improv spreadsheet, attach a voice message to it and send it via E-mail to an analyst who will come in later to work on the model.

Krus said Next's object-oriented development environment, Nextstep, is so flexible and easy to use that it would be feasible to individually tailor the graphical

user interface for every staff member.

Government markets are emerging as the third leg of Next's sales strategy, joining the education and commercial markets. According to Tony Bonidy, director of eastern sales, Next will do about \$141 million in sales this year, 15% or so to the U.S. government. He said the biggest federal buyers are the intelligence agencies



Next machine's development power makes the price easier to swallow, government users say

and organizations, which have close ties to universities.

A U.S. Air Force intelligence officer at the Next exposition said he bought Next machines mostly on the basis of price. He said the alternative to the \$7,000 Next workstation was a \$20,000 Sun Microsystems, Inc. Sparcstation.

According to F. William Strehl, vice president of the Washington, D.C., Area Next User Group, the rapid prototyping made possible by Next's object-oriented environment gives users such a competitive advantage in software development that some would prefer not to talk about it, he said.

Bonidy said the universe of firms developing software on Next platforms will expand when Next introduces versions of Nextstep, its object-oriented development environment, for Intel Corp. and Sun Scalable Processor Architecture microprocessors.

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Comparison of UNIX-Based RISC Servers					
Performance	CDC 4680	DEC 5800	HP 750	IBM 950	SUN 690 MP
Maximum No. of CPUs	4	4	1	1	4
SPECmark/SPECthruput (Max)	205	39	78	72	91
AIM User Loads	1381 ^a	65 ^b	NP	310	NP
TPC-B (Oracle)	112 ^c	NP	NP	NP	NP
Max. Disk Capacity (GB)	179	58	40	22	52
Standards Compliance					
POSIX-Certified UNIX	YES	YES	NO	YES	NO
OSinet Interop. Registration	YES	NP	YES	YES	NP

^a With four processors; certified and tested by AIM. ^b With one processor; multiprocessor data not available.

^c With two processors at a price of \$6.3K/lps. NP = Not Published

requirements. And it manages even the most data-intensive environments.

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terms solutions for some of the most complex data-intensive environments in the world.

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system that allowed for only fragmented communications, to a single highly integrated system that is literally transforming the way they do business.

And, to modernize key aspects of the space shuttle program, we integrated a large number of open systems products for the Flight Analysis and Design System (FADS) program.

In Denmark, FIH (Finance for Danish Industry), highly regarded throughout the financial community for the innovative ways it combines information technology with marketing, chose the InfoServers for an ORACLE client/server environment that integrates open systems technology with over 100 PCs.

Similarly, when Canada's Digitech Information Services, Ltd. needed to migrate its petroleum information database from an antiquated mainframe environment to an open systems alternative, they chose us because we were the only supplier who had implemented the necessary enhancements.

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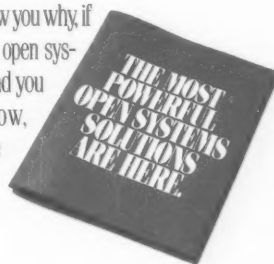
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Control Data's new RISC-based 4680 InfoServer, the industry's first mainframe-class UNIX server, delivers a "phenomenal level of performance."

CD CONTROL DATA

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Apple stocking antipiracy ammunition

BY JAMES DALY
CW STAFF

CUPERTINO, Calif. — Apple Computer, Inc. is readying technical ammunition in the fight against the illegal copying of software, a crime the Software Publishers Association (SPA) estimates costs the software industry \$6 billion annually.

Next month, Apple will introduce a Macintosh version of Spaudit, an SPA utility that gives information systems managers an instant inventory of their networked software in order to determine which applications have not been authorized. Spaudit has thus far been available only on the DOS platform. The Macintosh version of Spaudit will be free, according to spokeswoman Jackie Promes.

Why is a hardware company concerned about software crime? "Ultimately, [software piracy] is a problem that affects us all," Apple Chairman John Sculley said.

While the immediate cost of piracy is borne by the licensed user — who suffers when software firms have less funds to spend on product development — its effects can ripple into hardware companies as well.

Commodore Business Machines, Inc.'s Atari ST, for instance, gained such notoriety as a pirate's machine that it eventually became almost impossible to get developers to create applications for it, according to SPA Executive Director Ken Wasch.

The simplicity of software piracy has created a daunting challenge for industry executives. Most personal computer users can copy a \$500 program onto a \$2 disk in just a few seconds. "We're the only

industry that empowers every customer to become a manufacturing subsidiary," Wasch said.

Major problem overseas

Piracy is particularly acute overseas. By comparing actual software sales with the number of purchases each PC sale is expected to generate, the SPA estimated that nearly half of the software running on PCs in the U.S. is pirated.

That figure leaps to 80% in Germany, and the group calculates that an incredible 98% of the software in Korea is illegal.

At the SPA's annual conference this

fall, Kirk Loevner, director of Apple's developer group, outlined other ways Apple could help curtail the piracy problem. One solution, Loevner said, is the development of a network-based, serial-number key server, which registers each application's serial number so that only registered copies are launched over the network.

Apple could develop such an extension itself or co-develop it with a third-party product, Loevner said.

Promes also noted that Apple is backing plans by the SPA to come up with a standard set of software licensing agree-

ments. Such pacts, which often vary from vendor to vendor, can sometimes be confusing and muddy the waters during a search for pirated software.

Other nontechnical initiatives include campaigns to increase user awareness through education or, if necessary, litigation.

Sculley said an early objective is to make users aware of the many forms of piracy, including unauthorized duplication, downloading copyrighted software from electronic bulletin boards, enticing dealers to load free software onto hard disks to sweeten a sale and counterfeiting.

Apple also recently made a \$30,000 contribution to the SPA's Copyright Protection Fund, which underwrites the SPA's antipiracy efforts.

IBM presents the that brings



Cadre targets RDB design

PROVIDENCE, R.I. — Cadre Technologies, Inc. recently announced the release of DB Designer, which is intended to aid in the design and development of relational databases.

DB Designer includes an expert system-based reverse-engineering tool that deciphers business rules from existing data and automatically generates an initial database design rather than performing such a design manually.

Relational expertise, such as knowing what is required for creating correct domains, functional dependencies, foreign keys and referential constraints, is also built into the product, according to the company. This eliminates the need for the designer to be a "relational database guru" in order to create effective databases.

After the initial database design is completed using DB Designer, a second product, DB Generator, takes the design and creates the actual SQL/DDI database definitions.

DB Designer is currently available for the OS/2 platform. Pricing for the DB Designer tools starts at approximately \$20,000 for a kit containing both DB Designer and DB Generator for either Oracle Corp.'s Oracle or IBM's DB2.

CHRISTOPHER LINDQUIST

If you're a glutton for productivity, chances are you're considering open systems solutions for your business. But much of the menu is so unfamiliar or limited, it's enough to make you lose your appetite.

The IBM RISC System/6000™ family of POWERstations and POWERservers is for you. It's as open an open system as you'll find anywhere, to help you take a big bite out of communication barriers. With the RISC System/6000, you offer your suppliers and customers broad connectivity and management for IBM and non-IBM networks. And you also satisfy your hunger for the latest leading-edge technology,

without network or equipment upset.

Naturally, the RISC System/6000 family supports all major industry standards. And it also runs a smorgasbord of over 3,500 key applications. But that's only the appetizer. The family provides the widest range of binary compatible systems, so you're free to put the right level of machine performance and price at every location.

The RISC System/6000 also serves up remarkable performance, capacity and value. The POWERserver 550 runs at speeds you'd expect from a supercomputer, but runs up a tab starting at only \$58,000. And

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NEW PRODUCTS

Peripherals

Acma Computers, Inc. has created a 123-key programmable keyboard for personal computers.

The keyboard (\$125) allows users to program different sets of keystroke macros for different applications. Macros are stored in the keyboard memory.

The firm also announced its 6.4-pound notebook computer, the Acma 20-MHz SX Notebook (\$1,795).

Acma Computers
48501 Warm Springs Blvd.
Fremont, Calif. 94539
(510) 623-1212

Systems

Corollary, Inc. has announced a small computer systems interface (SCSI) module for its Corollary 486/SMP subsystem.

The Corollary 486/SMP SCSI provides high-performance SCSI I/O capability for the company's modular multiprocessor personal computer architecture. It includes a general-purpose Intel Corp. I486 processor.

The module costs \$6,000.

Corollary
17881 Cartwright Road
Irvine, Calif. 92714
(714) 250-4040

Icestation 3000, a desktop computer compliant with the Advanced Computing Environment consortium's standards, has been announced by Deskstation Technology, Inc.

The Icestation 3000 delivers 20 million instructions per second, according to the company. It is based on the 25-MHz Mips Computer Systems, Inc. R3000 chip and the Industry Standard Architecture bus. The system includes 32K bytes of instruction cache and 32K bytes of data cache.

The product is priced at less than \$8,000.

Deskstation Technology
13256 W. 98th St.
Lenexa, Kan. 66215
(913) 599-1900

Development tools

Soft Machines, Inc. has introduced Counterpoint, a software package that assists in writing concurrent and parallel computing programs in C language.

Counterpoint comprises a source module preprocessor and a set of runtime routines. It provides a set of constructs for conceptualizing and writing multi-threading programs.

The DOS version costs \$149.

Soft Machines
6351 Vanderbilt
Houston, Texas 77005
(713) 660-0269

Inmark Development Corp. has created Zapp, a development framework for Microsoft Corp. Windows applications.

Zapp encapsulates the Windows applications programming interface into C++ objects, providing object-oriented programming benefits. Zapp also simplifies dialog box creation and provides high-level printing support, data input forms and optimized memory allocation.

The framework costs \$195, or \$295 with source code. Zapp is compatible with C++ compilers from Borland International, Inc. and Symantec Corp.

Inmark Development
2065 Landings Drive
Mountain View, Calif. 94043
(415) 691-9000

Storage

The BSE Co. has released the Flashdrive line of portable hard disk drives for portable and desktop personal computers.

The drives have been approved by major portable PC manufacturers. Flashdrive models offer from 20M to 750M bytes of storage and reportedly run up to five hours on internal batteries.

Pricing starts at \$399 for the 1½-pound, 20M-byte Flashdrive 25.

BSE
Suite F
1622 Edinger Ave.
Tustin, Calif. 92680
(714) 258-8722

Quantum Corp. has announced new Passport XL removable hard drives.

The drives offer access times as low as 9 msec. They incorporate Quantum's Discache technology and up to 256K bytes of high-speed random-access memory for improved performance.

A 50M-byte version costs \$449; a 240M-byte drive costs \$1,099. A Micro Channel Architecture adapter is priced at \$329 and an XT/AT-small computer systems interface adapter costs \$219.

Quantum
1804 McCarthy Blvd.
Milpitas, Calif. 95035
(408) 432-1100

OS/2 software

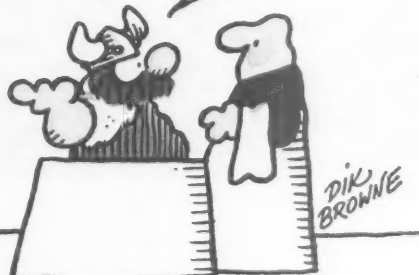
Abraxas Software, Inc. has developed Codecheck/2, a 32-bit applications development tool kit for OS/2.

The product (\$695) is based on expert systems technology, according to the company, and validates C language and C++ code that can be ported from OS/2 2.0 to 16-bit platforms.

Abraxas Software
7033 S.W. Macadam Ave.
Portland, Ore. 97219
(503) 244-5253

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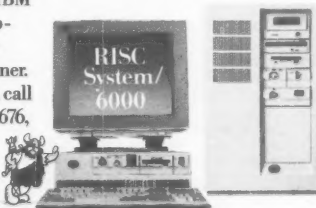
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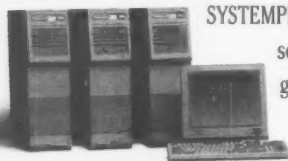


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NETWORKING

NETWORK SHORTS UB enters low end

On the heels of 3Com Corp.'s entry into the upgradable, "dumb" hub business [CW, Dec. 9], competitor **Unger-mann-Bass, Inc.** purchased a 50% equity in **Networth, Inc.**, marking its entry into the low-end arena and complementing its heavy-duty **Access/One** intelligent hub. UB also announced that Germany-based systems integrator and manufacturer **Siemens/Nixdorf Informationsysteme AG** has signed on to resell UB's networking products in Europe.

Meanwhile, hub maker **Chipcom Corp.** has integrated a terminal server module into its intelligent hubs, which will ship in the first quarter of 1992. **Synoptics Communications, Inc.** has integrated a Simple Network Management Protocol-based bridge management application into its hub, and **Cabletron Systems, Inc.** has beefed up its Token Ring management capabilities using reduced instruction set computing technology.

Frame-relay service will reportedly arrive in Canada early next year from **National Telecom Corp.** The carrier's Framework service is scheduled to roll out in the first quarter in Toronto, Montreal, Ottawa and Vancouver, British Columbia, with countrywide service slated for the second quarter. The service will be based on equipment from Campbell, Calif., switch maker **Stratacom, Inc.**, which supplies frame-relay backbones to several U.S. carriers.

Users wanting to test the media/videoconferencing waters now have the option to rent Austin, Texas-based **Videotelecom, Inc.**'s Mediamax systems on a month-to-month basis. The vendor said customers can apply a large portion of rental payments to a later purchase.

Utility backbone gets northern exposure

ON SITE

BY JIM NASH
CW STAFF

BELLEVUE, Wash. — People here live amid beauty wrought in part by violent forces. Earthquakes continue to reshape the region's angular mountains, and Northern Pacific storms push rain-sodden clouds over pine forests.

Providing electricity to an area as unstable as Western Washington has always been a challenge, but for Puget Sound Power & Light Co., the task appears to be getting more manageable.

The public utility is closing the first year of a three-year, \$3.1 million project to build alternative routes for its massive fiber and microwave communications backbone. The backbone carries all of Puget Power's data and voice traffic — everything from mundane corporate financial information to lightning-quick automated alerts about downed power lines.

The utility hopes to increase its network uptime from 99.98% to 100%. The difference seems small, but even a brief outage can force the utility to switch over to alternate power sources or shut down completely.

Alerts are critical, consider-

ing the chaos caused by the unannounced natural interruptions to which Washington is prone, explained Bruce Donaldson, Puget Power senior staff engineer. "Providing power is a balancing act," he said. If one area draws heavily on the power supply, cur-

a rupture must know about a break instantly, or they will start pouring electricity into the jumping and sparking line, he said.

Among the essential information carried by the Puget Power backbone is the amount of electricity passing through each sub-

conceptually looked like a single microwave line snaking through Puget Power's 4,500-sq-mile service territory. Roughly 80% of the backbone today is microwave transmission. It still connects about 30 sites, including coal-fired and hydroelectric plants, substations, division offices and its headquarters.

What has changed, Donaldson said, is the introduction of routing choices for the system. Numerous loops have been built into the backbone, giving operators and their Racal-Datacom, Inc. Omnimux 9000 T1 intelligent multiplexers alternate paths for network traffic in the event a segment is broken or shut down. He credits the Omnimux equipment for speeding up communications while providing the critical alternative routes.

As part of the construction, the backbone is being upgraded from an analog microwave-based system to digital microwave, which transmits at 45M bit/sec. The fiber segments, which were installed prior to this newest project, send messages at 135M bit/sec. "But the whole point is to offer alternate routes for data and voice," Donaldson said. "Whenever we took part of the microwave system down for maintenance, we'd interrupt 600 circuits [along the single backbone]. That's no good."



Charles Nishida

Natural forces such as the volcanic Mt. Baker challenge Puget Power's goal of 100% network availability

rent on high-tension lines flows in to compensate.

The power generation system is knocked off balance when a line goes down. To substations bristling with transformers, gigantic circuit breakers and power-flow sensing devices, the break appears to be a sudden drain. Substations on each side of

station. If neither of two adjacent stations is receiving power, the system assumes a line is down, and steel circuit breakers weighing several tons are opened to stop the flow. If the T1 line coincidentally is down at the same time, determining a break would be difficult and time-consuming.

At one time, the backbone

Switching users onto ISDN's D channel

ANALYSIS

BY JOANIE M. WEXLER
CW STAFF

Telecommunications managers are likely to re-evaluate the long-coming Integrated Services Digital Network (ISDN) because of National ISDN-1, a concerted effort among carriers and equipment makers to deploy the service coast-to-coast next year.

Companies still curious about the benefits of ISDN must understand the heart of the technology, the network's D channel. This little chunk of reserved bandwidth is an intelligent circuit within an ISDN dedicated to meaningful communication between the user's equipment and the network.

The D channel lets users re-appportion bandwidth at will in 64K bit/sec. increments, speed call-setup times and gather information about other devices on the network.

The D channel also simultaneously supports data packet-

switching within its boundaries.

The ability to reallocate ISDN circuits to different types of transmissions on the fly is economical for companies that must guarantee certain amounts of bandwidth to specific services at certain times of the day only. Users configuring to accommodate peak traffic loads are likely to have expensive bandwidth sitting idle or misallocated when traffic patterns shift.

Control benefits

Because of the D channel, "the user benefits by a tremendous level of control over the network," explained Steve Sazegari, a principal analyst at Dataquest, Inc., a research firm in San Jose, Calif. "Users can reconfigure their traffic while a call is in process."

According to Sazegari, a T1 network cannot do this dynamically because its communications slots are relatively fixed. While packet-switching technologies such as X.25 or the emerging frame relay can use a T1

network to efficiently blend traffic types and minimize bandwidth waste, they do not address peak-time service-specific band-

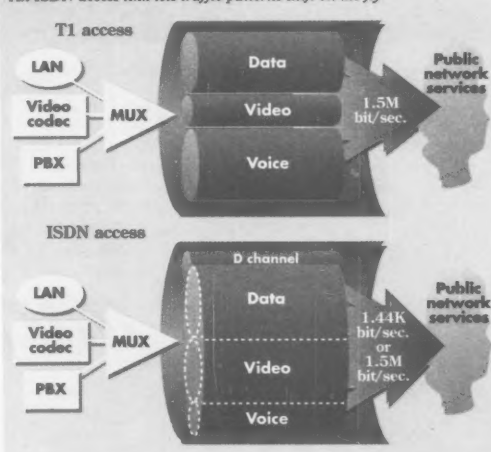
width guarantees.

The D channel also speeds call-setup time by six to seven seconds per call, compared with calls traversing a public network without a D channel, he said.

Continued on page 70

Justifying the means

An ISDN access link lets traffic patterns shift on the fly



DEC announces X product line, server

BY JOANIE M. WEXLER
CW STAFF

WESTFORD, Mass. — Digital Equipment Corp. last week joined the vendor campaign to put X terminals on commercial users' desktops.

The firm announced a seven-member product line and optional server that may be palatable to information systems managers looking to replace dumb terminals with low-cost yet network-savvy, manageable devices.

DEC has put a couple of spins on its VXT 2000 terminal line, slated to ship in January, that challenge the flood of recent competing X station rollouts aimed at the commercial market from the likes of NCR Corp., Tektronix, Inc. and Human De-

signed Systems, Inc. [CW, Nov. 25].

DEC's products offer extensive configuration and management innovations to appeal to IS departments looking to manage large numbers of desktops.

The \$1,999 to \$5,895 price

for the terminals, which include three monochrome, two gray-scale and two color models, "are a little at the top end," noted Steve Auditore, president of X Business Group, Inc., an X Window System-oriented consulting firm in Fremont, Calif.

He said the prices are "marginally" competitive even after factoring in life cycle costs, though X Business Group "expects DEC to sell a ton of these."

Intelligent, diskless X display terminals use the standard X protocol to access applications and data residing on multiple networked hosts. X terminals are currently offered by a variety of system vendors.

X terminals allow users to view and manipulate several windows of information simultaneously on one high-resolution screen.

Concurrent access to multiple resources is increasingly required of knowledge workers in client/server environments, particularly those using transaction

DEC HAS PUT a spin on its VXT 2000 terminal line that challenges the recent competing X station rollouts.

processing applications.

DEC is offering two modes of X terminal operation: Users can install X software on network host resources and download applications into their terminal or use "local clients" to tap existing host applications that have not been ported to the X protocol, said Vic Bellemare, program manager for the VXT 2000 line at DEC.

The local clients include the Open Software Foundation's Motif window manager and DEC VT300 and Unix terminal emulators, though no IBM terminal emulation has yet been addressed.

Another local client, a terminal manager, eliminates several end-user steps in booting up terminals, Bellemare said.

On the management side, a separate controller, dubbed Infoserver VXT 150, will configure and manage 20 X terminals. Users could add memory to their terminals, which come standard with 4M bytes of random-access memory, or to Infoserver to manage 50 to 100 stations per controller.

A proprietary DEC management system in the Infoserver provides network management. De facto standard Simple Network Management Protocol initially will not be incorporated into the products, though it is planned for the next release.

DEC's existing VT1200 X terminal can be upgraded to the new line for \$999.

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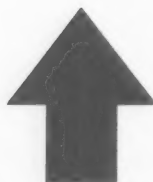
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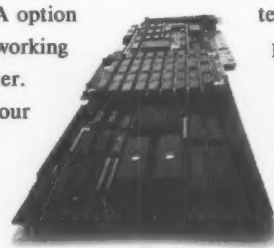
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	16	4	4	NEC
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	112	64	80	NEC
3. Internal hard-drive storage capacity	2.7GB	1GB	420MB	NEC
	4GB	4GB	2.4GB	TIA
4. Power supply	285W	240W	147W	NEC
	380W	355W	300W	NEC
5. Internal fans	3	1	1	NEC
	4	2	2	NEC
6. Sleep-in device rails	Yes	No	No	NEC
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Data based on manufacturers' specifications.

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Lack of standards inhibits groupware

BY JIM NASH
CW STAFF

Great concept, poor execution.

That pretty much sums up the groupware market to this point. The software that is meant to make people work better together appeals to a lot of information systems managers, but the market is too confusing to generate many sales, according to a recent report and several users.

Ann Palermo, director of office systems research at International Data Corp. (IDC), said many IS managers find the groupware name and the technology it

represents ambiguous.

Groupware generally refers to software designed to coordinate activities, applications and projects among multiple group members. Lotus Development Corp.'s Notes is usually held up as the clearest example of groupware.

On the other hand, other networking software, such as simple electronic mail and printer sharing, is typically used by workers for their own needs and is not considered groupware.

IDC predicts groupware sales will rise at an annual rate of 50% during the next five years. But that translates to only

\$320 million in U.S. sales in 1995. While a growth curve like that would please most industries, it is shallow compared with the traditional market performance of personal computer networks and networking-oriented software.

Comments by systems administrators tend to confirm the IDC findings. "What is it? That's what most people are still asking," said Pat Adkisson, systems manager at retailer Nordstrom, Inc. in Seattle. "Vendors have to educate people [about] what the term means."

Adkisson said Nordstrom has developed Infoexpress, an in-house, main-

frame-based file-access system that has a few basic groupware features. He said he would like to see groupware that runs on a mainframe and integrates all applications so that users do not need to log on to each program separately.

However, there are significant technical hurdles standing in the way of widespread acceptance of groupware. Providing the universal user directories needed to make the best use of groupware while securing those directories remains a thorny technical issue. Many users are turning to electronic signature technology as one way of securing and tracking application use.

Part and parcel of that are access questions. No common directory exists for even a sizable minority of all functions available on networks, Palermo said. In fact, separate directories must be kept for two groupware products from one vendor, On Technology, Inc., she explained.

Before groupware can take off, "we need to get the fundamentals of E-mail nailed down," said Roger Mizumori, messaging service planning manager at The Boeing Co. in Seattle. E-mail is the basis of groupware applications.

Experts say groupware will not catch

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Open market

While Lotus has a slight edge in the groupware arena, the market is fragmented



Top 5

(percent of 1990 revenue; total: \$41 million)

Lotus (Notes).....18%

Action Technologies
(Coordinator).....16%

Wordperfect
(Wordperfect Office).....16%

Powercore
(Network Scheduler II).....11%

Enable Software
(Higgins).....8%

Source: International Data Corp.

on until there is some standardization in E-mail systems. Groups in large companies often stretch beyond single departments, and members may be using different E-mail systems. If all members cannot use the same groupware, its purpose is defeated.

Users and vendors disagree on what constitutes groupware. Mark Komen, a network consultant at General Electric Aerospace in Philadelphia, said the closest thing to a standard today is Notes.

Komen said some third-party software vendors are writing their groupware to work with Notes, but they only address the PC market and not the Apple Computer, Inc. Macintosh world. GE Aerospace has about 1,200 Macintoshes connected with E-mail, but without a standard for Macintoshes, few groupware products will work together.

While he acknowledged that "groupware's not something we've looked into a great deal," Komen said some applications "would be extremely important." Groupware for purchasing is one example.

In addition, no established distribution channels for groupware exist. Traditional PC channels often cannot handle the sophisticated support groupware requires. And because groupware is a low-profit, low-volume sale, resellers are reluctant to stock it, Palermo said.

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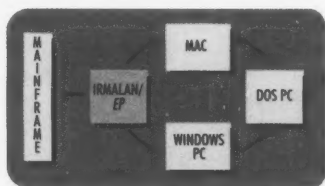
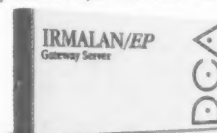
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Crosscomm meshes LAN Manager, SNMP

BY ELISABETH HORWITT
CW STAFF

MARLBORO, Mass. — Token Ring connectivity vendor Crosscomm Corp. has beat IBM to the punch in addressing a key user demand: the ability to use one workstation to manage IBM Token Ring local-area networks and the non-IBM routers and bridges that interconnect them.

Crosscomm's Ilan Internetwork Management System (IMS) Version 5.0 is said to integrate IBM's LAN Manager, which manages IBM Token Ring devices, with Simple Network Management Protocol (SNMP), an increasingly popular standard for managing multivendor LANs, bridges, routers and intelligent hubs (see chart). IMS 5.0 is also said to manage Crosscomm's own Ilan Token Ring connectivity products and to report alerts to IBM's Netview.

The vendor's target market niche is a potentially fruitful one, according to Richard Malone, a principal at Vertical Systems Group, a Dedham, Mass., research firm. "IBM shops are the fastest growing area of LAN internetworking right now," he said.

Malone, who reviewed the product, said he was impressed with its functionality and graphics-based user interface, which is still lacking in IBM's LAN Network Manager. But the question remains whether Crosscomm can persuade IBM information systems shops to base their LAN management strategies on a small third-party firm's product, he said.

IBM plans to bring out an SNMP-

based management workstation early next year, IBM spokesmen said recently. They also said IBM has no plans to integrate its SNMP system with LAN Network Manager. However, IBM is said to be working with third parties on software that would allow its Token Ring devices to be managed by an SNMP system.

Ilan IMS 5.0 allows the user to monitor alerts from both SNMP- and LAN Network Manager-compatible devices on a single screen, call up either type of device and initiate tests, Crosscomm said.

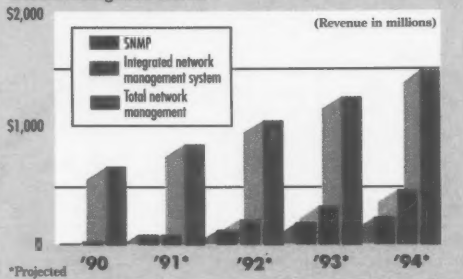
The system incorporates a graphical user interface based on Hewlett-Packard Co.'s Openview and Microsoft Corp.'s

Windows 3.0. It also incorporates a LAN monitor and protocol analyzer that capture and analyze sessions on LANs and display the results graphically, the company said.

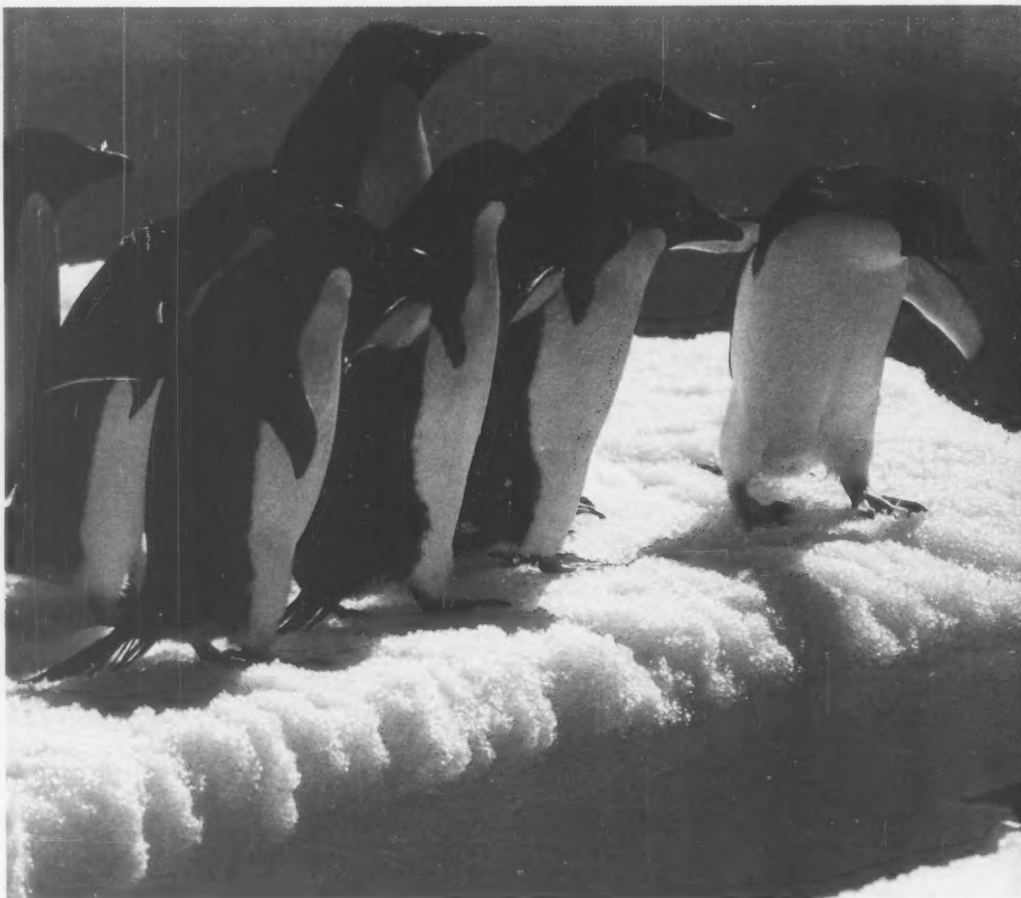
Priced between \$3,000 and \$4,000, Ilan IMS 5.0 is now available.

Long road ahead

SNMP is expected to continue to hold only a small percentage of the network management market



One of us has to



Switching users to D channel

CONTINUED FROM PAGE 63

One telecommunications user did the math: "Let's say you have a four-hour peak period for a given type of traffic during the day," said Phil Evans, director of telecommunications at FMC Corp., a worldwide Chicago-based conglomerate. "If you save six seconds per call, that's a minute for every 10 calls. If a typical voice conversation is three minutes, for every 30 calls, you've saved enough time for one free three-minute call."

Evans noted that multiplying the conservation over the course of a year yields "pretty significant" savings.

Evans, a senior adviser to the International Communications Association user group, also pointed to the D channel's ability to conserve network bandwidth by checking ahead to see if calls can be completed. "If the party I'm calling is busy, the network can automatically let me know that before I've used up all kinds of capacity on the network for a nonproductive application," he said.

Because the D channel provides message exchange between the user equipment and the network, enhanced services such as calling-party identification and call redirection are possible.

While users yield some network bandwidth to accommodate the intelligent channel, "it's a very small part of the network," Evans said, pegging the use at 25% to 50% of what would be used for misfired voice or data transmissions.

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NEW PRODUCTS

Local-area networking hardware

Vortex Systems, Inc. has announced Vinesmirror, a product which offers high-performance hardware-based disk mirroring for Banyan Systems, Inc. Vines users.

The product (\$8,995) includes an intelligent disk controller, 4M bytes of cache memory and four discrete small computer systems interface channels.

Vortex Systems
800 Vinial St.
Pittsburgh, Pa. 15212
(412) 322-7820

Fibronics International, Inc. has announced the availability of the FX8610 Workstation Server.

The product connects up to 48 workstations directly to a Fiber Distributed Data Interface network. Total throughput between the server and the network is up to 60M bit/sec.

The FX8610 Workstation Server costs between \$19,000 and \$29,000.

Fibronics
Communications Way
Hyannis, Mass. 02601
(508) 778-0700

Digital Communications Associates, Inc. (DCA) has announced new products for

connecting Token Ring networks over fiber-optic cable.

The Irmatrac 4/16 Fiber Optic Token Ring Adapter Convertible (\$1,195) works with XT/AT and Micro Channel Architecture bus-based personal computers when used with the Irmatrac Fiber Optic Media Access Unit (\$4,995). Up to 16 fiber-optic connections are supported, according to the vendor.

The company also announced the Irmatrac 4/16 Fiber Optic Converter, which converts twisted-pair wiring to fiber-optic media for connection to fiber-optic local-area networks.

DCA
1000 Alderman Drive
Alpharetta, Ga. 30202
(404) 442-4000

Exos, a division of Microdyne Corp., has announced new network adapter boards.

The Exos 505F (\$2,395) connects an XT/AT bus-based personal computer to a fiber network with full 100M bit/sec. Fiber Distributed Data Interface performance.

The Exos 505S (\$1,495) works with shielded twisted-pair copper wiring and also offers 100M bit/sec. performance.

Exos
207 S. Peyton St.
Alexandria, Va. 22314
(703) 739-0500

Network management

T3plus Networking, Inc. has created Bmxview, a wide-area network management software package with support for Simple Network Management Protocol (SNMP).

Bmxview runs under Unix and supports X Window System and the Open Software Foundation's Motif interface. The product offers features such as automatic routing and timed circuits. Network administrators can use Bmxview to control Bmx45 Bandwidth Managers or implement the Bmxview SNMP management information base (MIB) under a third-party management package.

Bmxview with SNMP support costs \$9,000. The SNMP MIB as a stand-alone package costs \$7,000.

T3plus Networking
2840 San Tomas Expwy.
Santa Clara, Calif. 95051
(408) 727-4545

Gateways, bridges, routers

Rad Networking Devices, Inc. has enhanced its LTB bridge and RTB bridge/router products.

The products integrate Token Ring local-area networks and IBM Systems Network Architecture networks. The LTB now offers support for IBM's LAN Manager and Netview systems. The RTB remote bridge/router supports direct Synchronous Data Link Control attachment and uses shortest-path-first routing.

The LTB-2 costs 4,995. The RTB-10 with one wide-area network connection is priced at \$5,995; a model with two WAN connections costs \$8,950.

Rad Networking Devices
Suite 600
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Huntington Beach, Calif. 92647
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Ascom Networks has created the Fibertalk 5000 FDDI Transparent Bridge and the Fibertalk 1000 Netsupervisor.

The Fibertalk 5000 is a 4M/16M bit/sec. bridge for Ethernet and Token Ring networks. It filters and forwards Ethernet frames at 14,880 packet/sec., filters Token Ring frames at 80,000 packet/sec. and forwards 6,000 Token Ring packet/sec. Pricing ranges from \$25,900 to \$40,500.

The Fibertalk 1000 Netsupervisor (\$12,000) is a Simple Network Management Protocol-based management and control system that provides graphics display of network performance statistics.

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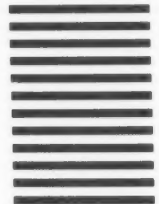
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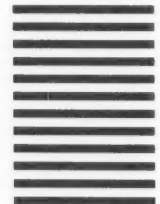
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MANAGER'S JOURNAL

MANAGEMENT SHORTS Nolan execs start firm



Two key consultants from Nolan, Norton & Co. have left to start **Praxxis Consulting Group** in Burlington, Mass. Thornton A. May (pictured), former head of Nolan, Norton's imaging practice, is a co-founder, along with Thomas Johnson, former Nolan Norton Institute head. A third co-founder is Ray Deck Jr., formerly of Braxton Associates.

The International School of Information Management (ISIM) in Santa Barbara, Calif., was recently a co-winner of the best higher education distance learning program award from the U.S. Distance Learning Association. The school has provided courses in information resources management via an asynchronous computer conferencing network.

ISIM shared the award with the department of engineering professional development at the University of Wisconsin at Madison.

The Association for Computer Operations Management (AFCOM) has issued a call for speakers for its fourth annual symposium, to be held next fall in Las Vegas. The symposium will focus on automating data center operations. Those interested should send personal data and proposed topics to AFCOM, 742 E. Chapman Ave., Orange, Calif. 92666. The deadline is Jan. 10.

The Association for Systems Management (ASM) has named four information systems professionals to the editorial review board of *The Journal of Systems Management*. The members named were Kim Canavan, an independent IS consultant; Darrell Corbin, a project manager/systems analyst at The Boeing Co.; Carol Covin, an associate at Abacus Technology; and Carl Crosswhite, an advisory development engineer at Storage Technology Corp.

Cooking up short-order software

Under the gun, IS teams learn how to create applications in weeks rather than months

BY JAMES DALY
CW STAFF

Dennis Hunter entered the future the way a groom typically enters a chilly swimming pool: He was thrown in.

Hunter, a systems engineer at Eastman Kodak Co. in Rochester, N.Y., learned that the sales and marketing department had decided to create a massive international database of Kodak users. The project, called Propassport, was so popular that within weeks, Kodak staff members had gathered 20,000 names to be entered into the multifaceted listing.

There was, however, one hitch: They forgot to tell the information systems department. "I told them it would take us at least a year to enter all that data — they wanted it in six weeks," Hunter says.

Through a boiled-down development cycle and gnashing of teeth, Hunter's team managed to crank out the Propassport database on schedule. But the experience had repercussions that led to the formation of Kodak's Rapid Deployment Group, which examines new technology and implements it without the formal evaluation process.

Hunter's experience is increasingly commonplace. The typical software development plan — a laborious process that often burns up a year or more — has gone the way of the dodo. Applications that once took months now take weeks or even days. "Five weeks from womb to tomb is about all we can afford," says Jeff VanSkyhawk, manager

of end-user services at Bose Corp. in Framingham, Mass.

The traditional glacial design pace of custom software applications is a luxury many developers can no longer afford. Users often find that the requirements may change substantially between the time the application is ordered and when it is delivered. "By the time you implement most systems, the people who wanted it originally

should be. Fortunately, this shift comes at a time of exciting developments in application generation technology. The chief component is object-oriented programming, which helps users build applications quickly and simply. Most current development environments — which use C language, Pascal, Fortran and Cobol — force the developer to think in a linear step-by-step fashion, complicating the development of systems having complex interrelationships.

Object-oriented developing supplants these rigid methods with graphical icons that a programmer can easily understand. Each object serves as a discrete module responsible for some facet of the application, similar in concept to the structure of a large organization in which each staff member performs a single part of a larger whole.

Older chunks of code can be snapped out and bolted onto new applications, streamlining the development process. This code inheritance process could signal a whole new era of disposable software. "If a software program only takes three weeks to create, what's the big thing if you throw it out when it's past its point of usefulness,"

Continued on page 76



Gary Hovland

aren't with the company anymore," says Ted Toler, an applications analyst at Union Carbide Corp. in South Charleston, W. Va.

If organizations have not implemented a stripped-down development cycle or are not thinking about it, they

Companies try out 'halfway' telecommuting

BY JIM NASH
CW STAFF

Most employees interested in telecommuting are grudgingly realizing that the mountain — in this case, the office — will never come to Mohammed. But there may be a compromise that reduces pollution-spewing traffic while pulling employees out of their homes.

This fall, two quasi-public remote workplaces, called Telecommuting Workcenters, opened in the Los Angeles area. They are part of an open-ended experiment offering workers a halfway point in which to work in office space shared by several Southern California employers.

Funded jointly by the federal and state governments with some contributions from local private industry, the

work centers opened in San Bernardino and Riverside counties. The San Bernardino site is expected to draw commuters who would have driven into Los Angeles; the Riverside office targets Orange County commuters.

George Rodriguez, a project manager at Southern California Edison Co., said the work centers demonstrate that commuting can be shortened while management retains some control over employees. Edison is one of five area companies that has committed to having at least one person in the Riverside work center a minimum of one day a week.

Rodriguez said his company has contributed \$50,000 and lent some office tools to the two sites. Edison, he explained, will review employee performance next fall to see if it will continue to participate. Currently, about 50 Edison employees attend both work cen-

ters. Rodriguez said that while it is too early to measure the plan's success, some figures speak for themselves. He estimated that each Edison employee will save an average of two hours of driving 41 gridlocked miles every day.

The work centers have all the comforts of the office, including standard workplace equipment: cubicles, personal computers, telephones, voice mail, fax machines and exercise facilities. Office space is free unless companies want secured offices, which rent for \$100 a month. Telecommunications and office supply costs are the responsibility of participating employers.

The issue of telecommuting "has essentially been focused on working at home," said Paul Rupert, associate director of New Ways to Work, a San Francisco-based nonprofit telecommuting advocacy group. This experiment breaks the logjam of concerns that managers continue to express about employees working at home, Rupert said.



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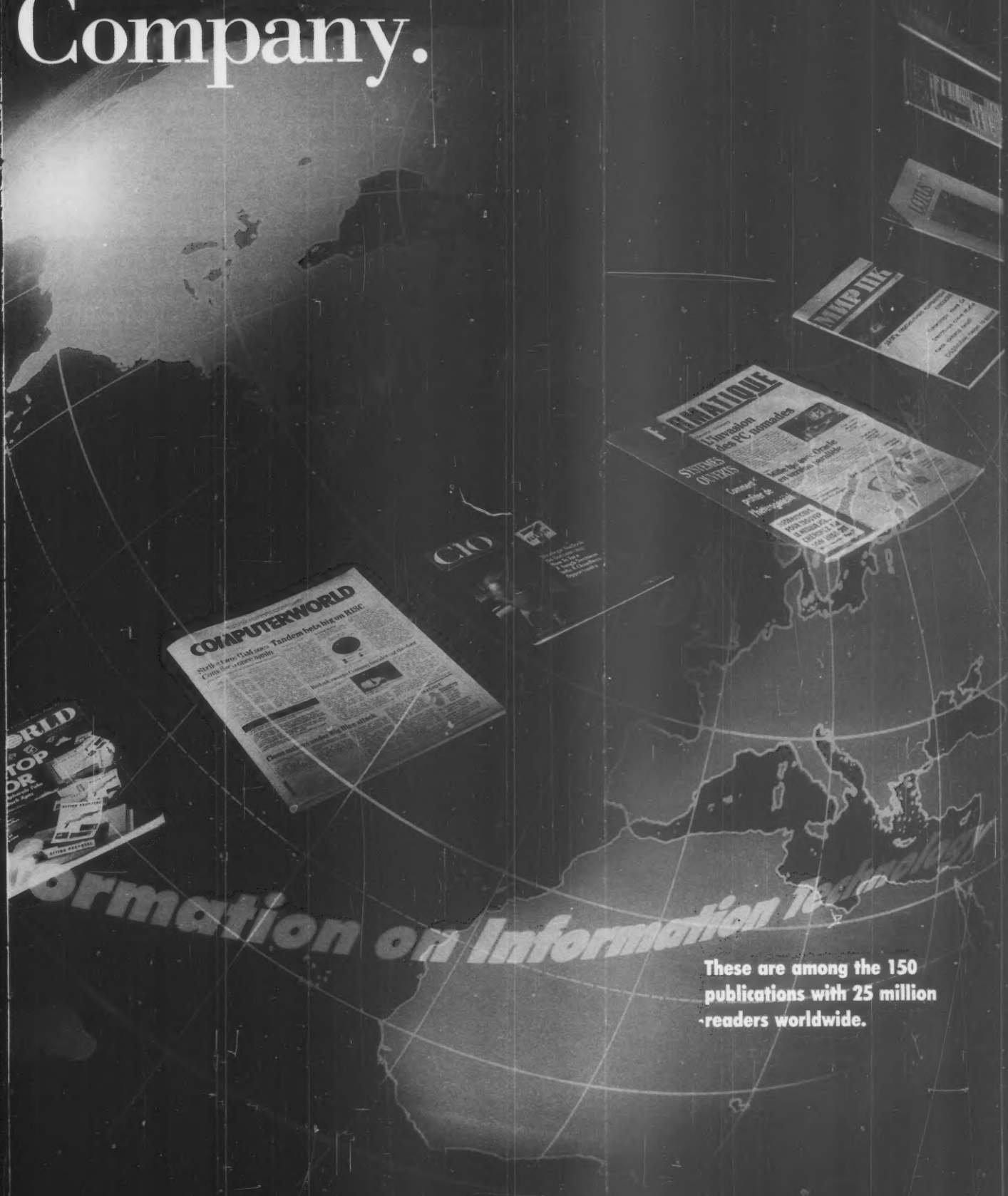
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IS departments cook up more short-order software

CONTINUED FROM PAGE 73

says Bernadette Reiter, president of Boulder, Colo.-based Clebern Corp., which makes the Macroscopic object-oriented development kit.

With Macroscopic, users have been able to create applications in weeks that had been projected for a year or more. "The reusability of the code is key," says Mark Whitney, a senior project coordinator at Delta Airlines, who is evaluating Macroscopic for a revenue control application. "We don't want to train an army of programmers each time we need to build a new application."

Developers can also turn to relational database management systems. Some RDBMS products, such as Acius Corp.'s 4D, are programming environments that require no custom code. You simply take redefined pieces of code and join them together from menus.

Don't get too comfortable

However, going from tortoise to hare can be psychologically wrenching.

"People get comfortable; they learn a new technology, and then they sit back and live off it," VanSkyhawk says. "Trouble is, these days you can't afford to be comfortable."

Several techniques have proven valuable for IS managers switching into the fast lane. Systems managers now more actively encourage end-user input early in the development cycle. In old-style programming, written specifications would

be developed and handed to the developers, and they would run with them.

The newer approach is for the end user to participate in application prototyping. The developer and end user create sample screens, menus, lists of procedures and sample report formats. Completed sketch in hand, the developer has a clearer idea of an application that previously existed only in the end user's head.

The advantages to both developer and

end user are myriad. More accurate development priorities surface. The IS departments become consultants to end users to assist them in developing, rather than becoming black holes swallowing up new projects that are never seen again. And the final application works closer to the end user's way, not the programmer's.

A deeper level of involvement is for end users to develop their own applications with the IS department serving in a consultant's role. This also gives the end user-turned-developer an appreciation for the time involved to develop an application.

Developers also offer these tips for speeding the development process:

- Think small. Slice large problems into

smaller, more easily managed portions.

- Simple problems need simple solutions. Increased software complexity often leads to reduced productivity.

- Instill confidence in the users. "Ask. We can probably do it," Toler says.

- Do not make early prototypes too rough. Errors caught early in the life cycle of application development are less expensive to fix than those caught later.

Although the early stages of the speeded-up development cycle can be tough, system managers encourage sticking with it because the payoffs can be enormous. "Once people learn they can crank out applications in one-third the time they're used to, it's a great big adrenaline rush," VanSkyhawk says. "It's like a whole new world has opened up."

For the first time, combining Open Systems with OLTP makes

Ouellette honors Unisys' Leto

BEDFORD, N.H. — The rejuvenation of the information systems department in a business unit of financially beleaguered Unisys Corp. was recently honored with the annual Developing the Human Side of Technology Award from Ouellette & Associates Consulting, Inc., an IS and human resources consulting firm based here.

Robert J. Leto, manager of IS at Unisys' Orange County manufacturing operations in Mission Viejo, Calif., was presented with the award earlier this month.

In 1989, Leto's department was beset by application backlogs and users unhappy with service that Leto acknowledged was below par. In two years of severe financial constraints, the 43-employee department dramatically improved service while holding down costs.

The key factors were forming a help desk and breaking up the centralized group of 13 systems analysts into seven teams assigned to different user areas. Before the changes, analysts spent 70% of their time on support work and only 30% on new projects, according to Leto. Since the reorganization, analysts devote more than half their time to new applications.

"We dispensed the nontechnical aspects of the analyst job back into the user community where they should have been in the first place," Leto said.

CLINTON WILDER

COMMENTARY

Clinton Wilder

Time to make hard changes



So what holiday gift does Peter Drucker want?

Nothing less than a fundamental revamp of the way most white-collar and service workers perform their jobs.

In the current issue of *Harvard Business Review*, the estimable management professor argues that raising the productivity of knowledge and service workers is not only the No. 1 imperative for business profitability but the single most important goal for any industrialized society.

Drucker does not discuss re-engineering or information technology directly, but his message is a crucial one for any high-level IS professional. It is not really a new message, but it is one that cannot be overemphasized. Current individual and group work processes must be rethought and restructured — now. In most corporations today, knowledge and service workers are simply not as productive as they could be.

You have heard the old story: Inefficient business processes have been automated for the past three decades, making it harder than ever to change them. But the imperative to change is clear. In the current economic doldrums, companies simply cannot afford the luxury of unproductive people and processes.

In many corporations, however, the easy solution — massive layoffs and/or asset sell-offs — may turn out to be worse than the problem. Shrinking the size of the payroll or asset base does not fundamentally change the way the business is run. Merely "hunkering down" in a trough of the business cycle and waiting for the upturn is no longer sound business strategy because the market and competitive landscape change too rapidly.

By the time the economy rebounds, a more innovative, flexible competitor — perhaps based outside the U.S. — may have beaten you to the punch.

Trimming the work force with huge voluntary severance programs may be particularly damaging. In countless cases, it is the best employees who opt for the generous incentives. They are the ones confident that they can find another job or entrepreneurial enough to start up a new business. "Paying your best people to leave" does not sound like a good long-term strategy to me.

IS especially should take heed of this issue because the most competent people with needed skills are going to be the most critical IS resource in the years to come. In the annual CSC Index survey of nearly 450 North American IS executives released last week, the issue of "improving the IS human resource" posted the biggest gain in importance compared with last year's survey, jumping from 13th place to fifth.

At a recent meeting with consultants in the San Francisco office of CSC Index, I asked how they could sell big re-engineering projects to clients in the throes of a recession. The answer, in so many words, was, "What better time?" Few companies recognize the need to continuously measure, evaluate and change themselves when business is booming.

But how many firms in this recession are opting to change themselves the hard way — by re-evaluating all their work processes in the way Drucker and others suggest? In my opinion, it is only the leading-edge companies, the same ones in which IS and business are truly integrated and share the same goals and language. That means the gap between the business successes and laggards in any given industry will continue to widen.

This has been a tumultuous year for the IS profession. There was another passel of notable executive departures: Mellon Bank's George DiNardo, MCI's Allan Ditchfield, Federal Express' Ron Ponder and United Technologies' John Hammitt top the list. There were huge outsourcing deals struck by General Dynamics, Continental Bank, United Technologies and NCNB — and the emergence of a major new player (well, sort of) in that game named IBM.

But most of all, every IS professional felt all kinds of new pressure to deliver more value at less cost.

The only way to do that with any long-term success is actively, not reactively. IS must play a critical role in helping every organization challenge its business processes to improve them. Drucker urges asking questions such as "What is the task, and what are we trying to accomplish?" And perhaps most importantly, "Why do it at all?" How many staff hours are wasted on tasks that add no real value to the company or its customers?

In many cases, IS departments have the technical knowledge of the tools of change but are among the worst practitioners of inefficient processes and resistance to change. IS executives would do well to set an example by asking Drucker's questions in their own backyards. In fact, it sounds like re-evaluation and change within IS departments should head the list of IS New Year's resolutions for 1992.

Wilder is *Computerworld's* senior editor, management.

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Issue Date	Ad Closings Color* B/W		Editorial Feature	Show Distribution	Ad Readership Issue	Response Card Decks
Jan. 6	Dec. 20	Dec. 27	Executive Report: To Be Announced			
Jan. 13	Dec. 27	Jan. 3	Product Spotlight: Windows Applications			Mails: Jan. 15 Space Close: Dec. 6 Mat'l Close: Dec. 9
Jan. 20	Jan. 3	Jan. 10	Executive Report: To Be Announced Industry Closeup: Automotive Industry			
Jan. 27	Jan. 10	Jan. 17	Product Spotlight/Buyers' Scorecard: LAN Management	Communication Networks Jan. 28-30 Washington, D.C. Windows OS/2 Jan. 28-30, San Jose, CA	Harvey Study	
Feb. 3	Jan. 17	Jan. 24	Executive Report: To Be Announced			
Feb. 10	Jan. 24	Jan. 31	Product Spotlight: E-Mail	Networld Feb. 11-13, Boston	Starch Study	Mails: Feb. 12 Space Close: Jan. 3 Mat'l Close: Jan. 6
Feb. 17	Jan. 31	Feb. 7	Executive Report: To Be Announced			
Feb. 24	Feb. 7	Feb. 14	Product Spotlight/Buyers' Scorecard: Accounting Systems			
Mar. 2	Feb. 14	Feb. 21	Executive Report: To Be Announced			
Mar. 9	Feb. 21	Feb. 28	Product Spotlight: Client/Server Application Development		Starch Study	Mails: Mar. 11 Space Close: Jan. 31 Mat'l Close: Feb. 3
Mar. 16	Feb. 28	Mar. 6	Integration Strategies: Pulling Macs into the Enterprise Network Industry Closeup: Aerospace			
Mar. 23	Mar. 6	Mar. 13	Product Spotlight/Buyers' Scorecard: RISC Desktop Machines and Servers	DB Expo Mar. 23-26 San Francisco	Starch Study	
Mar. 30	Mar. 13	Mar. 20	Executive Report: To Be Announced			
Apr. 6	Mar. 20	Mar. 27	Product Spotlight/Buyers' Scorecard: PC Software—Fresh Application Categories and New Twists on Old Ones	Comdex Spring '92 and Windows World Apr. 6-9, Chicago		
Apr. 13	Mar. 27	Apr. 3	Executive Report: To Be Announced			Mails: Apr. 15 Space Close: Apr. 3 Mat'l Close: Apr. 6
Apr. 20	Apr. 3	Apr. 10	Product Spotlight: Printers Best Suited for a LAN Environment			
Apr. 27	Apr. 10	Apr. 17	Executive Report: To Be Announced		Starch Study	
May 4	Apr. 17	Apr. 24	Product Spotlight: Midrange Systems That Run Enterprises			
May 11	Apr. 24	May 1	Integration Strategies: Creating an "Open" Company Industry Closeup: Personal Care Industry		Starch Study	Mails: May 13 Space Close: Apr. 3 Mat'l Close: Apr. 6
May 18	May 1	May 8	Product Spotlight/Buyers' Scorecard: Routers	Interop East May 18-22 Washington, D.C.		
May 25	May 8	May 15	Executive Report: To Be Announced			
June 1	May 15	May 22	Product Spotlight: What the Well-Equipped Help Desk is Using			
June 8	May 22	May 29	Product Spotlight: MRP II			Mails: June 10 Space Close: May 1 Mat'l Close: May 4
June 15	May 29	June 5	Special Edition: Annual Premier 100 Magazine (Ad Close: May 1) Executive Report: To Be Announced			
June 22	June 5	June 12	SPECIAL SUPPLEMENT: Computerworld's 25th Anniversary Product Spotlight/Buyers' Scorecard: Portable Computing (laptops, notebooks, pen-based and wireless technologies)	PC Expo June 23-25 New York City AIIM June 22-25 Anaheim	Starch Study	
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CALENDAR

JAN. 12-18

Pacific Telecommunications Conference. Honolulu, Jan. 12-15 — Contact: Pacific Telecommunications Council, Honolulu, Hawaii (808) 941-3789.

Network Management Seminar. San Francisco, Jan. 13 — Contact: AG Group, Walnut Creek, Calif. (510) 937-2479.

The 14th Annual ATE & Instrumentation Conference. Anaheim, Calif., Jan. 13-16 — Contact: Miller Freeman Expositions, Boston, Mass. (617) 232-3976.

IS Forum: Technology for the 90s. San Jose, Calif., Jan. 14 — Contact: Jay Kamlani, Jaymark Applied Systems, Inc., Fremont, Calif. (510) 651-6030.

Telecom Industry Productivity and Quality. Washington, D.C., Jan. 14-15 — Contact: Kathy Lentz, Telecommunications Reports, Washington, D.C. (202) 842-3022.

Amiexpo. Long Beach, Calif., Jan. 14-16 — Contact: Amiexpo, Valhalla, N.Y. (914) 741-6500.

Scientific and Engineering Applications of the Macintosh. San Francisco, Jan. 15-17 — Contact: Macintosh, Worcester, Mass. (508) 755-5242.

JAN. 19-25

Uniform '92. San Francisco, Jan. 22-24 — Contact: Bob Linke, Professional Exposition Management Co., Carol Stream, Ill. (708) 260-9700.

Nextworld Expo '92. San Francisco, Jan. 22-24 — Contact: Jeannine Barnard, World Expo Corp., Framingham, Mass. (508) 879-6700.

JAN. 26-FEB. 1

Demo '92. Palm Springs, Calif., Jan. 26-29 — Contact: Industry Publishing Co., Belmont, Calif. (415) 592-8880.

Marketing the IS Organization Internally. New York, Jan. 27-28 — Contact: Ouellette & Associates, Inc., Bedford, N.H. (603) 623-7373.

The AS/400 Help Systems Operations Automation User Conference. Orlando, Fla., Jan. 27-30 — Contact: Help Systems, Inc., Minnetonka, Minn. (612) 933-0609.

Improving Productivity in Systems Development. Phoenix, Jan. 27-31 — Contact: Applied Computer Research, Inc., Phoenix, Ariz. (602) 995-5929.

Comnet '92. Washington, D.C., Jan. 27-31 — Contact: Rachel Winett, World Expo Corp., Framingham, Mass. (508) 879-6700.

Improving Programmer Productivity Seminar. Washington, D.C., Jan. 28 — Contact: James E. White, Computer Consulting, Washington, D.C. (202) 544-8374.

Computer Graphics Show. New York, Jan. 28-30 — Contact: MJO, Inc., Silver Spring, Md. (301) 846-7795.

Windows & OS/2 Conference. San Jose, Calif., Jan. 28-30 — Contact: Stan Politi, CM Ventures, Inc., Emeryville, Calif. (510) 601-5000.

Infotext. Las Vegas, Jan. 28-30 — Contact: Infotext Publishing, Inc., Capistrano Beach, Calif. (714) 493-2434.

FEB. 2-8

Western Communications Forum. Anaheim, Calif., Feb. 3-5 — Contact: Western Communications Forum, Chicago, Ill. (312) 938-3500.

Information Management Conference. New York, Feb. 4-5 — Contact: The Conference Board, New York, N.Y. (212) 759-0900.

Microtrends. Washington, D.C., Feb. 5-6 — Contact: The International Communications Industries Association, Fairfax, Va. (703) 273-7200.

FEB. 9-15

Computer Graphics '92. Orlando, Fla., Feb. 10-12 — Contact: Sheila A. McDonald, Frost & Sullivan, Inc., New York, N.Y. (212) 233-1080.

Network '92. Boston, Feb. 11-13 — Contact: Annie Z. Scully, Bruno Blenheim Associates, Englewood Cliffs, N.J. (201) 596-8542.

Dexpo. Calgary, Alberta, Feb. 11-13 — Contact: Miller Freeman Expositions, Boston, Mass. (617) 232-3976.

FEB. 16-22

Information Security Managers Symposium. San Diego, Feb. 18-20 — Contact: Pamela Bissett, MIS Training Institute, Framingham, Mass. (508) 879-7999.

CASE World Conference & Exposition. Santa Clara, Calif., Feb. 18-20 — Contact: Digital Consulting, Andover, Mass. (508) 470-3880.

Seybold Seminars '92. Boston, Feb. 18-21 — Contact: Beth Sadler, Seybold Seminars, Malibu, Calif. (213) 457-5850.

FEB. 23-29

Annual Platforms for Computing (PC) Forum. Tucson, Ariz., Feb. 23-26 — Contact: Adventure Holdings, Inc., New York, N.Y. (212) 758-3434.

National Conference & Exposition on Trade Show Marketing. Las Vegas, Feb. 23-27 — Contact: Exhibitor Show '92, Clarendon Hills, Ill. (708) 850-7779.

1992 International Help Desk Conference. New Orleans, Feb. 23-27 — Contact: Help Desk Institute, Colorado Springs, Colo. (719) 531-5138.

Software Development Spring '92. Santa Clara, Calif., Feb. 23-28 — Contact: Miller Freeman Publications, Inc., Santa Clara, Calif. (415) 905-2414.

Synoptics Users Group Conference. San Francisco, Feb. 24-26 — Contact: Amparo Lago, Synoptics Users Group, Santa Clara, Calif. (408) 764-1073.

Macapp Conference. Orlando, Fla., Feb. 24-28 — Contact: Macapp Developers Association, Everett, Wash. (206) 252-6946.

MARCH 1-7

Share '92. Anaheim, Calif., March 1-6 — Contact: Pam Schur, Share headquarters, Chicago, Ill. (312) 822-0932.

Unix & Open Systems. Toronto, March 4-5 — Contact: Kai Juman, Datapro/Canada, North York, Ontario (416) 496-3131.

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PRODUCT SPOTLIGHT

Imaging systems

Now that imaging is an enterprisewide concern, it's time to balance user needs with IS concerns such as growth, architecture and compatibility

BY SCOTT MCREADY

Remember when you didn't have to worry about imaging technology? Sure, a few end-user departments were converting paper documents or microfilm to electronic form, but there was no reason for you to get involved in choosing their equipment. Imaging was a point solution that addressed a limited number of specific business problems.

As you well know by now, those days are over. Companies are realizing that they can significantly reduce their annual paper processing costs — which in 1991 are estimated to exceed \$100 billion in the U.S. — with imaging and are thus starting to apply the technology to applications closer to information systems concerns, such as accounts payable, human resources and claims processing. The imaging revolution is beginning to make the personal computer revolution look trivial.

Now that networks and databases can handle the larger data blocks associated with imaging, there are fewer reasons not to move to this technology.

However, before you go out to purchase an imaging system, you need to balance the features and functionality users want with criteria that is IS-related, such as compatibility, growth potential and architecture.

First and last

The first trick is to find a system that will accommodate your first imaging application as well as all the ones that follow. Users would love for you to develop everything at once, but obviously, you'll have to first identify which applications will deliver the biggest bang for the buck. Characteristics of a high-value application include the following:

- The documents need to be processed quickly.

McReady is director of image management systems at IDC/Avante Technology, a joint venture to provide market research and consulting services.

- The process requires a large number of transactions.
- The transactions are valuable.
- The process is repetitive.

International monetary transfers, credit-card correspondence and trust are high-value applications in banking, while insurance companies are focusing on claims processing, investment services and underwriting.

The problem is, even though most vendors don't sell vertical systems, not all offerings are suitable across a broad range of applications. All too often, IS managers find structural weaknesses when they attempt to use the same system for a second or third application.

To avoid that scenario, make sure the application development environment is rich in features and functionality. The sure measure is to examine the installed base of each vendor and determine the variety of applications it has successfully implemented.

Application programming interfaces (API) are important here, since you most likely have existing data applications that need to hook into the new imaging application. IBM's Imageplus is a standout in this area, offering a well-specified series of APIs that programmers or third parties can write to.

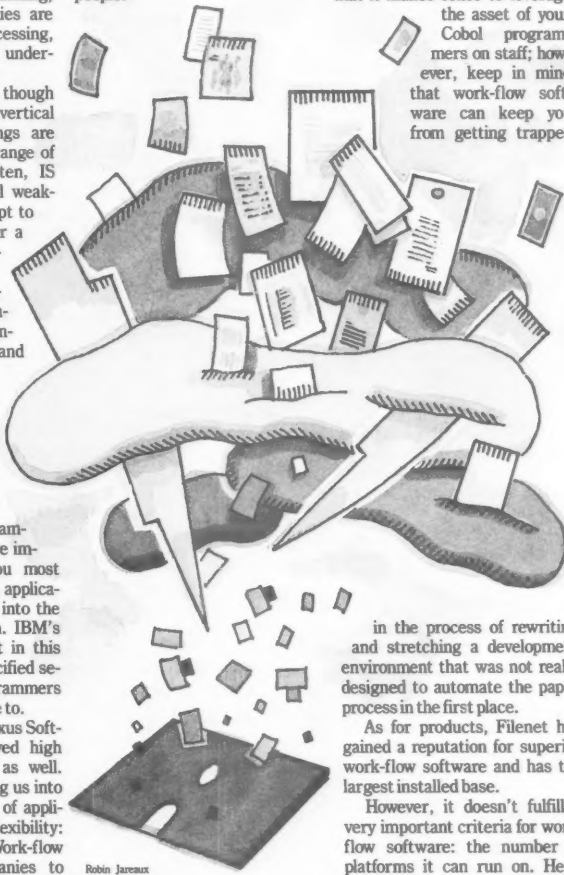
Filenet Corp. and Plexus Software, Inc. have received high marks for robustness, as well. Their two products bring us into an altogether new area of applications development flexibility: work-flow software. Work-flow software allows companies to

get beyond mimicking the serial-based paper process, where a document is viewed by one person at a time, and takes advantage of the fact that a single electronic document can be viewed simultaneously by a number of people.

Unlike conventional development environments, work-flow software also allows you to revise — not rewrite — applications after they're developed.

Several of the large system vendors will probably point out that it makes sense to leverage

the asset of your Cobol programmers on staff; however, keep in mind that work-flow software can keep you from getting trapped



Robin Jareaux

in the process of rewriting and stretching a development environment that was not really designed to automate the paper process in the first place.

As for products, Filenet has gained a reputation for superior work-flow software and has the largest installed base.

However, it doesn't fulfill a very important criteria for work-flow software: the number of platforms it can run on. Here, Recognition Equipment, Inc. and Plexus are the leading contenders. As for supporting the major platforms, American Management Systems Corp. will offer work-flow software for the IBM platforms, while Computron Technologies Corp. says it will run on Wang Laboratories, Inc. and Digital Equipment Corp. environments.

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INSIDE

The Good and the Bad

Top vendors' strengths and weaknesses. Page 83.

Buyers' Scorecard

Wang's WIIS tops user ratings of imaging systems. Page 84.

Product Guide

A comprehensive listing of midrange and high-end scanners. Page 87.

Enterprisewide concern

CONTINUED FROM PAGE 81

Platform and standards support are two areas that imaging vendors have done well in, at least in the past year or so.

The office system vendors have generally done a good job ensuring compatibility with their existing product lines. IBM and DEC both get high marks for basing their image offering on strategic architectures. Wang stands out with the best integration into its office environment.

All of the imaging vendors have also been quick to support Microsoft Corp.'s Windows 3.0, thereby ensuring some degree of interoperability at the desktop. Most also support Transmission Control Protocol/Internet Protocol as well as the popular network operating systems, albeit only at the Netbios level.

Something to be wary of is the fact that because current computer architectures — with the exception perhaps of Wang's VS — were not designed with

imaging in mind, standards support usually entails lower performance levels.

Peripheral support is more straightforward. Two or three years ago, most vendors typically supported two or three different scanners, one or two printers, one type of magnetic storage and one type of optical storage. Because scanners and printers now offer much better interfaces, the cost and time to support new devices has been reduced dramatically.

Just the same, IBM is clearly the leader in supporting the greatest number of peripherals, with Wang a strong contender.

The peripheral categories you should consider include the following:

• **Scanners:** Of all the peripherals, a quality scanner is the most important purchase (see story page 88). This device is the most likely to experience expensive downtime, so it's important to

get one that provides a higher level of throughput than is necessary. In the mid-range level (20 to 30 page/min.), Fujitsu America, Inc. scanners have demonstrated good reliability, while at the high end, Eastman Kodak Co.'s Imagemark is good.

• **Printers:** Key selection criteria are capacity and price.

• **Optical jukebox:** Many vendors are trying to push magnetic storage, claiming it offers superior performance. However, poor performance is more likely a factor of insufficient queuing and prefetch capabilities in the imaging systems themselves.

Systems vendors

Wang leads in market share among traditional systems vendors

	Product name	Installed base	Image server platforms	Workstations	DBMS
Wang	WIIIS and Openimage	430	VS, DOS, Netware	Windows 3.0, Macintosh, DOS	Oracle, Pace, Gupta, Btrieve
IBM	Imageplus	403	OS/2, AS/400, MVS/ESA	DOS, Presentation Manager	OS/2 SQL, Natural, DB2
DEC	Decimage Express	71	VMS	X Window, Vaxstation, Windows 3.0	RDB
HP	AIMS	50	HP/UX	DOS, Windows 3.0	Informix Turbo
Unisys	Infoimage Folder	45	Unix	Windows 3.0	Oracle
NCR	DMS	5	Unix	Windows 3.0	Informix Turbo

Source: IDC/Avante Technology

CW Chart: Michael Siggins

*Total worldwide installed base data estimated through the end of September 1991

For high-capacity needs, optical jukeboxes will be a necessity. For 12-in. disk jukeboxes, we suggest FileNet or Cygnit Sys-

tems, Inc. systems, while 5¼-in. disk jukeboxes from Hewlett-Packard Co. and IBM appear promising.

Service bureaus help conversions

BY JANE STANHOPE

The most tedious and time-consuming part of implementing an imaging system is the first part: the initial conversion of all your paper documents into an image format.

Early adopters of imaging systems had only one choice: to tackle this mind-boggling chore on their own. Now, about half the users implementing imaging are using conversion service bureaus, leaving the do-it-yourself approach to those who need tight control over the process and have the resources to complete each step of this time-consuming, costly procedure.

The fact is, conversions can take as long as a year to complete and usually account for one-third of the total cost of the

imaging implementation.

Some people choose the in-house method thinking it will be less expensive, but that's the case only if you manage the conversion correctly — from document preparation through scanning, indexing, quality assurance, storage and loading into the image system (see box below).

Cutting corners

There are other ways to save money during this process. For instance, you could hire out only certain portions of the conversion process or even hire a consultant just for project management expertise, relying overall on your own staff, equipment and space.

This is not a bad route to take if you only have a small number of documents to convert, if you would rather not purchase a lot of equipment, if your staff is small or stretched or if your bud-

get is tight.

Selecting a bureau is much like selecting a system vendor. You need to consider things such as the range of services offered, location, vendor reputation, experience with similar conversions and cost. Your imaging vendor can also give you a list of recommendations.

The types of services usually provided by bureaus include the following:

- Conversion at either the customer or vendor site.
- Conversion of various types and sizes of media, including paper, engineering drawings, maps, aperture cards, microfilm and microfiche.
- Optical character recognition conversions with key-word or full-text indexing.
- The ability to work with confidential or classified materials.
- Document management and conversion consulting services.
- System integration and appli-

cation development services.

- Project management services.
- Off-site storage and indexing of original hard copy files.
- Archival and backup services.

Bureaus are entering the service business from many different angles: Some paper-to-microfilm bureaus are just now expanding into optical. There are data conversion houses that specialize in converting information from one computer system to another, and there are document processing companies that provide data entry and keypunch services (these companies already have the staff needed for paper handling and indexing). There are also new companies that specialize in paper-to-optical conversions. The latter usually provide all of the services listed above.

Prices for these services vary from bureau to bureau, but the bulk of the cost usually falls to document preparation, indexing and quality assurance.

Conversion work is generally done under a fixed-price con-

tract based on a certain number of pages. Costs can range anywhere from 5 cents to more than \$1 per page, including equipment, labor and overhead.

Actual costs depend on many factors, including the complexity of each step, who is doing the conversion, the number of pages involved, the equipment used, the amount of quality assurance and the location of the conversion.

For instance, West Coast Information Systems, Inc., a service conversion bureau in Walnut Creek, Calif., estimates that it costs roughly 17 to 25 cents per page for a 1 million-page conversion of 8½- by 11-in. documents.

Alternatively, an aperture card image of an engineering drawing that is 16 times bigger than that can cost \$1 to \$1.25 per page because of the additional time it takes to scroll through the document during the quality assurance process.

Although cost is a key concern for most companies, try to avoid the temptation of a low bid. A higher bid from a reputable conversion house may turn out to be less costly than one that ends in cost overruns or redoing the conversion altogether. •

Stanhope is associate director of image management systems at BIS Strategic Decisions in Norwell, Mass.

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Paper to image

- 1) **Document preparation:** Documents are prepared by removing paper clips and staples, identifying which need to be scanned and placing them in the proper order.
- 2) **Image capture:** This is accomplished with scanners, either through a conversion bureau or via an in-house method.
- 3) **Indexing:** An index must be created for each document or batch of documents. Manually entered or created using OCR, it is used to retrieve the image from the database.
- 4) **Quality assurance:** You need to check scanning and indexing to ensure that your staff or the service bureau has met your accuracy and readability requirements.
- 5) **Storage:** Data is stored on magnetic disk or tape.
- 6) **Loading into the image system:** Data is transferred to optical disc for loading into the imaging system.

COMPUTERWORLD



with your computer/modem

Any discussion of imaging eventually comes down to cost. While vendors are accustomed to talking in terms of cost per seat, in imaging, cost per transaction is a much more valid measure. That's because in imaging, savings are measured by how much work actually gets done.

A good cost-per-transaction ratio depends on the system's user interface and the capability of the back-end software to allow transactions to occur. FileNet is the winner in back-end software.

Key cost factor

The choice between a client/server architecture and a host-based system plays a large role in determining your cost per transaction. Client/server delivers the lowest cost per transaction, while a hostcentric architecture

will deliver the lowest cost per seat.

Beyond the technical capabilities of the system, keep in mind three rules of thumb when you select a vendor:

- If the vendor doesn't understand in great detail the business problem you are trying to solve, show him the door.
- Take a good look at the vendor's financials, no matter how

large or small it may be.

• Simply because a systems vendor claims to be in the image systems business does not mean it is investing in research and development or marketing at a rate suitable enough to make it a major player down the road. So even if your primary system supplier claims to be in this business, do not automatically assume its products are going to address all of your application requirements.

Many other imaging issues lie outside the technical realm. One of the most important is that if you bring the paper process and data application under a single automation environment, who now owns it: the end user or IS? Do you feel qualified or do you want to be responsible for supporting a paper process (electronic or not) that will inevitably change over time as the competitive elements of that business change?

Despite the complexity of these issues, the answer does not lie in waiting. The sooner you begin, the sooner you'll gain an understanding of how the organization functions, which can only be to your advantage. •

Traditional image vendors

FileNet leads in market share among traditional image vendors

	Product name	Installed base*	Image server platforms	Workstations	DBMS
FileNet	Workflow Business System	487	Unix	Windows 3.0, Unix	Oracle
Laserdata	Laserview	348	DOS, Windows 3.0	DOS, Windows 3.0	Gupta, Oracle
Micro-dynamics	Micro-dynamics MARS	188	Macintosh	Macintosh	Proprietary
Plexus	XDP	115	Unix	Windows 3.0	Informix Turbo
Viewstar	Viewstar	68	DOS, Windows 3.0, OS/2	Windows 3.0, DOS	Gupta, Sybase, DB2 on the host

*Total worldwide installed base data estimated through the end of September 1991

Source: IDC/Avanti Technology

CW Chart: Michael Siggins

Selection criteria

When asked to name the three most important criteria for choosing an imaging system, respondents named 'integration' No. 1

Integration with existing equipment/software	40%
Vendor's reputation	26%
Connectivity/Interoperability	23%
Capture/Retrieval speed	22%
Work-flow routing capability	22%
Ease of use	21%
Software features/Functions	21%
System price	21%
Customization capability	19%
Services/Support/Training	18%

Base of 182 respondents using systems
(Each respondent asked to specify three factors)

Source: Association for Information and Image Management

CW Chart: Michael Siggins

Optical quandary

Most imaging systems require the high capacity of an optical jukebox. The question is, which disk size should you settle on: 14-, 12- or 5¼-in.? If 5¼-in., should you choose write-once or the new multifunction drives, which accommodate both write-once and rewritable disks?

Twelve-inch is still the market share leader, but vendors are leaning toward 5¼-in. in their newest systems. The trouble is, disk vendors can't seem to agree on a standard in the 5¼-in. area, slowing the availability of volume production (see story page 31).

Disc	Capacity	Cumulative shipments*	Percent used for image systems
14-in. write-once	6.8G - 10.2G bytes	173	75%
12-in. write-once	5G - 7G bytes	49,000	90%
5¼-in. write-once	.65G - 1.28G bytes	127,220	80%
5¼-in. rewritable and multifunction	.65G - 1G bytes	202,000	10%
3½-in. rewritable	.128G bytes	2,920	0%

*Worldwide shipments in units as of mid-1991

Source: Rothchild Consultants

Strengths and weaknesses of top vendors

► Digital Equipment Corp.:

Strengths: Based on open, well-specified architectures; excellent network capabilities.

Weaknesses: Lack of prefetch capability; lack of work-flow software; scalability.

► FileNet Corp.:

Strengths: Most robust work-flow software on market; best back-end services; excellent service and support.

Weaknesses: Relatively small firm with revenue of about \$125 million; proprietary server architecture.

► Hewlett-Packard Co.:

Strengths: Integration with New Wave at the desktop; imaging system software put under quality-control process; worldwide marketing focus.

Weaknesses: Hard-wired to Informix Software, Inc. Turbo database; transaction volume is not optimized because of back-end software; lack of market experience in the U.S.

► IBM:

Strengths: Based on existing IBM architectures; service and support is second to none; workstation software is the same from MVS/ESA to Application System/400.

Weaknesses: Limited number of index fields for folder software; work-flow software is not as robust as competitors'; host-based architecture.

► Laserdata:

Strengths: Ability to integrate into a VAX environment; relatively good broad-based development tools; VAR support.

Weaknesses: Lack of work-flow software; products historically late to market; relatively small company with fiscal 1991 revenue of approximately \$15 million.

► Microdynamics:

Strengths: Good experience in government markets; ease of developing relatively simple applications; competitive pricing.

Weaknesses: Scalability; no work-flow software.

► NCR Corp.:

Strengths: Excellent understanding of specific vertical markets; good financial position; strong basic understanding of user requirements.

Weaknesses: Hard-wired to Informix Turbo database; transaction volume not optimized because of back-end software; small installed base.

► Plexus Software, Inc.:

Strengths: Runs on multiple platforms; software provider only (no interest in underlying hardware); rapid development environment for simple applications.

Weaknesses: Hard-wired to Informix Turbo database; relatively small company.

► Unisys Corp.:

Strengths: Excellent back-end capabilities; based on standards-based, open architecture; overall corporate commitment to marketplace.

Weaknesses: Lack of effective work-flow software; relatively small installed base; slow time-to-market for new products.

► Viewstar Corp.:

Strengths: Excellent integration with document management software; willingness to satisfy any customer requirement; understanding of distributed architecture.

Weaknesses: Lack of market focus at times; work-flow software; relatively small company with revenue of approximately \$14 million.

► Wang Laboratories, Inc.:

Strengths: Excellent integration with Wang Office; large installed base; first system vendor to enter image market.

Weaknesses: Financial condition; field service and support varies from excellent to poor, depending on geographic location; lack of work-flow software.

IDC/Avanti Technology

BUYERS' SCORECARD

Wang's WIIS inspires uncommon loyalty

BY MICHAEL L.
SULLIVAN-TRAINOR
CW STAFF

Wang Laboratories, Inc.'s financial troubles apparently have not dampened the enthusiasm of those who use its image-processing

software. Wang Integrated Image System (WIIS) received the highest ratings from its users in *Computerworld's* Buyers' Scorecard survey on image-processing software, outscoring its two primary rivals — Filenet Corp.'s Workflow and IBM's Imageplus — by a seven-point margin.

The WIIS user rating of 84 out of a

possible 100 was well above the average score of 79 and Workflow's next best score of 77. Imageplus users gave it marks that translated into a third-place ranking of 75.

Thirty users of each product were surveyed. Overall scores were derived by multiplying the ratings each user group gave its own product by the importance factors assigned to the criteria. Scores were then converted to base 100. Each feature/functionality measure was rated based on a 1-to-10 scale, where 10 is very good (see methodology next page).

WIIS users gave their product the best ratings achieved by any product in all but one of 15 categories, and in that category — amount of customization required — WIIS tied for first with Workflow.

In many cases, the margin of WIIS' wins was also fairly substantial. Users rated the product 8.9 in the category of capacity to handle the work load and 9.0 in responsiveness of vendor service — the two most important categories to all users surveyed. Imageplus users rated it 8.3 and 8.5 in those categories, respectively.

Not all of WIIS' wins reflected the same high degree of approval. For example, in the area of compatibility with other vendors' equipment, it scored over its rivals with a user grade of 7.2, while for overall purchase price and implementation costs, its leading score was 7.4. Lack of compatibility, high price and the speed of retrieval and scanning were also mentioned as weaknesses in verbatim responses to the survey.

Filenet's Workflow received its highest user rating (8.7) for image capture capability, which earned it a close second-place ranking behind WIIS. In fact, Workflow achieved 10 second-place rankings, with high marks for work-flow

management features (8.5) and ease of use (8.4). Users assigned Workflow a relatively low rating of 6.0 for overall purchase price and implementation cost. Optical character recognition (OCR) and forms processing features (6.3) and compatibility with other vendors' equipment (6.6) were among the weaknesses pinpointed by the product's users.

While none of the 30 Workflow users surveyed said they would purchase a different product if they had to make the choice again, they responded in verbatim that an inability to share images and a difficult programming language were weaknesses of the product.

IBM's Imageplus also achieved seven second-place rankings, four of them in the six categories most important to users. Like WIIS, the product received its highest ratings for vendor service (8.5), capacity (8.3) and image capture (8.2). Imageplus achieved only a slightly better rating than Workflow in the cost category — 6.2. The product received the

lowest rating of any product in the survey — 5.4 — for OCR and forms processing features. Users also gave the product a relatively low rating (6.3) for ease of installation.

Six out of 30 Imageplus users said they would be unlikely to purchase the product again if they were making the decision today. Many stated that they were not satisfied with the networking and compatibility features of the product.

Overall, 78% of all respondents said they were very satisfied with their products. Eighteen percent were somewhat satisfied, and 3% were somewhat dissatisfied.

By contrast, 90% of WIIS users said they were very satisfied, while 73% of Workflow users said they were very satisfied, and 70% of Imageplus users said they were very satisfied. •

COMPUTERWORLD BUYERS' SCORECARD		
Image processing software		
Product scores reflect average user ratings for all measured areas, weighted by user-assigned importance. Response base: 30 users per product		
Product	Highest ratings	Lowest ratings
Wang's WIIS SCORE 84	Responsiveness of vendor service Capacity to handle the work load Image capture capability	Compatibility with other vendors' equipment Purchase price and implementation costs Amount of customization required
Filenet's Workflow SCORE 77	Image capture capability Work-flow management features Ease of use	Purchase price and implementation costs OCR and forms processing features Compatibility with other vendors' equipment
IBM's Imageplus SCORE 75	Responsiveness of vendor service Capacity to handle the work load Image capture capability	OCR and forms processing features Purchase price and implementation costs Ease of installation

Total possible score	100
Mean score	79

KEY RATINGS

Wang's WIIS sweeps the Top 6 categories users rated as most important, with particularly high marks for service, capacity and image capture. IBM's Imageplus achieves four second-place ratings, while Filenet's Workflow ranks second in two categories and ties for second in another.

Criteria importance rating:

9.1 Capacity to handle the work load

Wang's WIIS	8.9
IBM's Imageplus	8.3
Filenet's Workflow	7.8

8.9 Responsiveness of vendor service

Wang's WIIS	9.0
IBM's Imageplus	8.5
Filenet's Workflow	8.2

8.7 Image capture capability

Wang's WIIS	8.5
Filenet's Workflow	8.7
IBM's Imageplus	8.2

8.7 Quality of technical support

Wang's WIIS	8.7
IBM's Imageplus	8.1
Filenet's Workflow	8.1

8.5 Ease of use

Wang's WIIS	8.5
Filenet's Workflow	8.4
IBM's Imageplus	6.8

8.4 Overall speed of processing

Wang's WIIS	8.4
IBM's Imageplus	7.6
Filenet's Workflow	7.4

A CLOSER LOOK

Wang's WIIS achieves first position in all but one of 10 categories covering everything from compatibility issues to text retrieval. Filenet's Workflow ties for first in the amount of customization required category, while IBM's Imageplus comes in third in seven out of 10 categories, including a very low rating in the OCR and forms processing features category.

User importance rating:

8.2 Work-flow management features

Wang's WIIS	8.7
Filenet's Workflow	8.5
IBM's Imageplus	7.0

7.7 Depth and accessibility of documentation

Wang's WIIS	8.3
Filenet's Workflow	7.8
IBM's Imageplus	6.7

7.1 Ease of installation

Wang's WIIS	8.2
Filenet's Workflow	7.9
IBM's Imageplus	6.3

8.0 Application development tools

Wang's WIIS	8.4
Filenet's Workflow	7.8
IBM's Imageplus	6.7

7.5 Amount of customization required

Filenet's Workflow	7.7
Wang's WIIS	7.7
IBM's Imageplus	6.5

7.0 Compatibility with other vendors' equipment

Wang's WIIS	8.3
IBM's Imageplus	6.6
Filenet's Workflow	6.4

8.4 Compatibility with installed systems

IBM's Imageplus	7.9
Wang's WIIS	7.8

8.0 Overall purchase price and implementation cost

Wang's WIIS	7.8
IBM's Imageplus	6.2
Filenet's Workflow	6.0

7.2 Text retrieval features

Wang's WIIS	8.1
Filenet's Workflow	8.0
IBM's Imageplus	6.9

6.0 OCR and forms processing features

Wang's WIIS	7.8
Filenet's Workflow	6.3
IBM's Imageplus	5.4

Verbatim

What do you like best/least about this product?

(Responses based on most frequently stated answers)

Likes

Ease of customization/modification
Compatibility with existing equipment
Functionality/Flexibility

Dislikes

Lack of compatibility
Too expensive
Speed of retrieval/scanning

Filenet's Workflow

Likes

Work-flow software
Good service and support
Ease of customization/modification

Dislikes

Lack of compatibility
Too expensive
Inability to share images

IBM's Imageplus

Likes

Performance
Ease of use
Compatibility with existing equipment

Dislikes

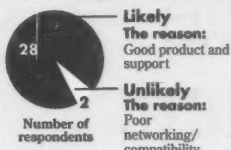
Lack of flexibility
Too expensive
Poor retrieval/scanning speed

Loyalties

How likely would you be to purchase this product again if you were making the decision today?

(Reasons based on most frequently stated responses)

Response base: 30



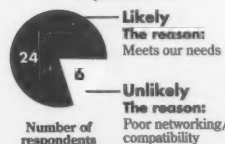
Filenet's Workflow

Response base: 30



IBM's Imageplus

Response base: 30



Vital statistics

Response base: 90
Number of respondents

How many years have you been involved with image processing software?

Five or more	12
Three to four	33
One to two	35
Less than one	10

What is your responsibility for image processing software?

(Multiple responses allowed)

Evaluate or recommend vendors	78
Determine need	76
Select vendors	69
Set standards for organization	64
Approve or authorize purchases	44
Buy for user departments	31

What is your position?

Director	22
Manager	41
Staff member	27

On what hardware does this product run?

IBM mainframe	21
IBM AS/400	13
Wang VS	29
Other	27

METHODOLOGY

Products rated in *Computerworld's* Buyers' Scorecard on image-processing software were selected based on the market share of the vendors in terms of installed base and market value.

The minimum number of respondents for each product group was 30. The survey was conducted by First Market Research in Austin, Texas, using a random sample of user names.

RESPONDENT PROFILE

Thirty-three percent of the respondents run their image-processing software on a Wang Laboratories, Inc. VS minicomputer, 23% use an IBM mainframe, 14% use an IBM Application System/400, and the remaining 30% use other vendors' systems.

Eighty-six percent of the respondents use their image-processing software for mainstream applications. Fourteen percent are still running pilot or prototype applications.

Thirty-nine percent of the respondents are project managers, 37% are information systems managers, and 24% are staff members. Thirty-nine percent have been involved with image-processing software for between one and two years, 37% between three and four years, 13% more than five years and 11% less than one year.

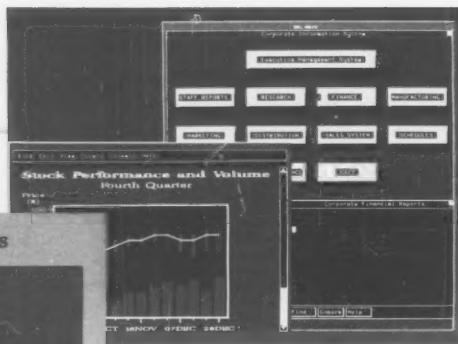
Ninety-four percent of the respondents said they are receiving productivity benefits from their products. Only 3% said they are not. Fifty-three percent said the greatest benefit is accomplishing work faster. The next most commonly mentioned plus was reduced staff requirements.

Users said they would like to have the following features or functions added to their products: compatibility with more platforms, more optical character recognition capabilities, more robust work-flow language and higher speed scanners.

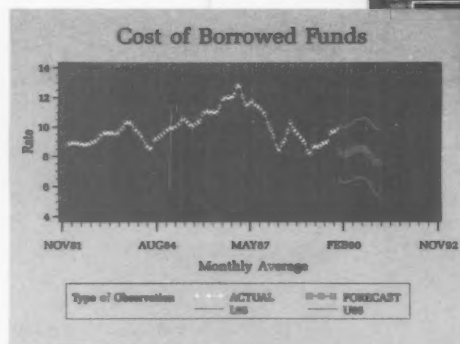
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Executive



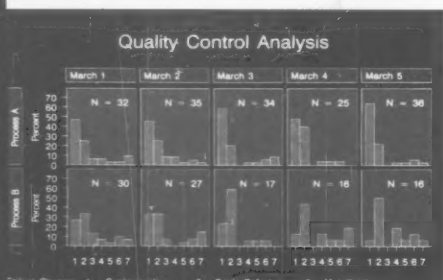
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Scanners: 16 page/min. and higher

VENDOR	PRODUCT	MAXIMUM RATED SPEED / THROUGHPUT SPEED ¹	HARDWARE SUPPORTED	SOFTWARE SUPPORTED	MEMORY/HARD DISK REQUIREMENTS (BYTES)	SCANNER CONFIGURATION	TYPES OF MEDIA SCANNED	TYPES OF SCANNING BEST SUITED FOR	CHARACTER RECOGNITION CAPABILITIES	MAXIMUM RESOLUTION (DOT/IN.)	FORMATS FOR SAVED IMAGES	INTERFACES SUPPORTED	WARRANTY	PRICE	MANUFACTURER
Bell & Howell Co. (708) 673-7800	Copiscan II Model 2135	36/Varies by application	IBM PCs and compatibles, PS/2	DOS, OS/2, Windows 3.0	2M/40M	Desktop	8½- by 11-in. paper, legal size, checks, payment stubs	Document imaging systems	Software-dependent	200	TIFF	Proprietary, Kodak, Xerox, Qinter, IBM, Laser Master, Infotronics	Three months	\$7,395 includes scanner	Bell & Howell
	Copiscan II Model 2137	48/Varies by application	IBM PCs and compatibles, PS/2	DOS, OS/2, Windows 3.0	2M/40M	Desktop	8½- by 11-in. paper, legal size, checks, payment stubs	Document imaging systems	Software-dependent	200	TIFF	Proprietary, Kodak, Xerox, Qinter, IBM, Laser Master, Infotronics	Three months	\$7,395 includes scanner	Bell & Howell
	Copiscan II Model 3338	43/Varies by application	IBM PCs and compatibles, PS/2	DOS, OS/2, Windows 3.0	2M/40M	Desktop	8½- by 11-in. paper, legal size, checks, payment stubs	Document imaging systems	Software-dependent	300	TIFF	Proprietary, Kodak, Xerox, Qinter, IBM, Laser Master, Infotronics	Three months	\$10,995 includes scanner	Bell & Howell
Calera Recognition Systems, Inc. (408) 720-8300	M-Series	18/15	IBM PCs and compatibles, PS/2, Macintosh II or later	DOS 5.0 or later, Macintosh System 6.0 or later	6M/10M	Desktop	8½- by 11-in. paper, legal size	Document imaging systems, forms processing	600 - 2,400 char./sec. recognition speed; ASCII file formats supported; spreadsheet, word processor, graphics, IBase	300	TIFF, Microsoft Windows, Paint PC Paintbrush, MacPaint	SCSI I, XT/AT bus, AT bus	Six months	\$29,995 - \$44,595 includes scanner, OCR device, host interface, cabling	Fujitsu
Cognitronics Corp. (619) 282-8184	Complex Image Processor Model 200	70/30	IBM PCs and compatibles	DOS	680K/200M	Desktop	3- by 6-in. to 8½- by 11-in. paper	Document imaging systems, forms processing, image archiving, OCR indexing, data capture	100 - 2,000 char./sec. recognition speed; dependent on character quality; ASCII file formats supported, Omnimat, Handprint	120	CCITT G3, G4, Cognitronics format standard	SCSI I, XT/AT bus, AT bus	Three months	\$48,500 includes scanner, PC software	Cognitronics
Document Technologies, Inc. (415) 946-6100	IS425 Document Image Scanner ²	25/25	DTI Image Server 200, Image Server 2000	DOS	640K/1.4M	Desktop	8½- by 11-in. paper, checks, payment stubs	Document imaging systems, transaction processing	25 page/min. recognition speed; ASCII file formats supported	400	DTI	AT bus, video	Three months	\$4,400 - \$4,800 (OEM pricing) includes automatic feeder, interface kit	Fujitsu
Eastman Kodak Co. (716) 253-1590 (800) 445-6325	Imagelink Scanner 900	90 - 120/50 - 83	Any system with SCSI interface	DOS	NA/Application-dependent	Free-standing	8½- by 11-, 5- by 5-, 12- by 20-in. paper, legal size, checks	Document imaging systems, forms processing, image archiving	90 - 120 page/min. recognition speed; ASCII file formats supported	400	TIFF	SCSI II	Three months	Dependent on configuration	Kodak
Fujitsu America, Inc. (408) 432-1300	M3093E	35/25	IBM PCs and compatibles, Macintoshes, any workstations	Dependent on system configuration	Dependent on system configuration	Desktop	Up to 11- by 17-in. paper, legal size	Document imaging systems, forms processing, image archiving	Software-dependent	400	Depends on controller software	Proprietary, RS-232, video	One year	\$5,650 includes scanner with 50-page automatic document feeder	Fujitsu
	M3096E +	27/20	IBM PCs and compatibles, Macintoshes, any workstations	Dependent on system configuration	Dependent on system configuration	Desktop	Up to 11- by 17-in. paper	Document imaging systems, forms processing, image archiving	Software-dependent	400	Depends on controller software	Proprietary, RS-232, video	One year	\$6,720 includes scanner with 50-page automatic document feeder	Fujitsu
	M3096G	27/20	IBM PCs and compatibles, Macintoshes, any workstations	Dependent on system configuration	Dependent on system configuration	Desktop	Up to 11- by 17-in. paper	Document imaging systems, forms processing, image archiving	Software-dependent	400	Depends on controller software	SCSI II	One year	\$6,720 includes scanner with 50-page automatic document feeder	Fujitsu
IBM (914) 288-3254	IBM 2456 Image Scanner	24/20 - 30	IBM PS/2 with MCA and SCSI attachment	OS/2 Version 1.3, Imageplus Workstation Program/2 Version 1	2M/20M	Desktop	8½- by 11-, 11- by 17-in. paper, legal size, checks, payment stubs	Document imaging systems, forms processing, image archiving	Dependent on system configuration	400	MOD/CA/IOCA	SCSI I	One year	\$6,995 includes scanner, user's guide, cabling, optional diskette	IBM
Improvision (510) 653-5335	NPS10 Image Scanner	48 (200 dot/in.), 36 (300 dot/in.)/Dependent on host	IBM PCs and compatibles, DEC Microvax, Sun System 3 and 4, Sparcstation	Dependent on system configuration	640K (PC), 1M (workstation)/200K	Desktop	8½- by 11-in. paper, legal size, 12-in. by unlimited size using continuous feed mode, checks, payment stubs	Document imaging systems, image archiving, production scanning	Dependent on system configuration	400	TIFF, CCITT G3, G3-2D, G4	XT/AT, AT bus, SCSI II, CGVS, VMEbus, Qbus, Sbus, Turbo channel	One year	\$9,000 includes scanner, compression module, 16-bit parallel interface or video interface, automatic document feeder	Improvision, Ricoh
	NPS20 Image Scanner	48 (200 dot/in.), 36 (300 dot/in.)/Dependent on host	DEC Microvax, IBM PCs and compatibles, Sun System 3 and 4, Sparcstation	Dependent on system configuration	640K (PC), 1M (workstation)/200K	Desktop	8½- by 11-in. paper, legal size, 12-in. by unlimited size using continuous feed mode, up to 12- by 160-in., checks, payment stubs	Document imaging systems, image archiving, production scanning	Dependent on system configuration	400	TIFF, CCITT G3, G3-2D, G4	XT/AT, AT bus, SCSI II, CGVS, VMEbus, Qbus, SCSI II, Sbus, Turbo channel	One year	\$25,000 + includes scanner, compression module, 16-bit parallel interface or video interface, automatic document feeder	Improvision, Ricoh
Intrafeed, Inc. (202) 686-2360	Powerscan 120	120 (single-sided), 240 (dual-sided)/Depends on system configuration	IBM PCs and compatibles, PS/2s, Sun Sparcstation	Windows 3.0, DOS 5.0	4M/100K	Free-standing	8½- by 11-in. paper, legal size, checks	Document imaging systems, forms processing, image archiving	500 char./sec. recognition speed; Omni font recognized	400	TIFF, Windows, PCX, Kodak, Wang, Xonics	SCSI I	Three months	\$139,000 (average price) for turnkey includes computers, software, scanner, cabling	Kodak
Recognition Equipment, Inc. (214) 579-6000	XP80 Document Scanner	55/50	IBM PCs and compatibles, any Unix-based system	DOS, Unix	4M/80M	Free-standing	8½- by 11-in. paper	Document imaging systems, forms processing	55 page/min. recognition speed; ASCII file formats supported	400	Proprietary	Proprietary, KSAA2, Ethernet	Three months	\$350,000 (low end) includes scanner with single font recognition; \$1.2 million (high end) with multi-font recognition and front- and back-image capabilities	Recognition Equipment

¹8½- by 11-in. page/min. Maximum rated speed is the absolute fastest time the scanner can scan a document. The normal throughput speed is the average time (under normal conditions) the scanner can scan a document. ²Not sold to end users. The companies included in this chart responded to a recent survey conducted by *Computerworld*. When a vendor is unable to provide specific information about its product, the abbreviation NP (not provided) is used. When a question does not apply to a vendor's product, the abbreviation NA (not applicable) is used. Contact vendor for further product information.

Scanner plays leading role in imaging system success

BY KRISTY HOLCH

One way to ensure that your imaging system will fail is to choose the wrong scanner. This is where documents first enter the system for processing or storage, so any bottleneck will strongly downgrade your productivity.

Holch is associate director of the Scanner Market Strategies service at BIS Strategic Decisions in Norwell, Mass.

The fact that most imaging systems vendors recommend compatible scanner models does not preclude your responsibility in the decision. By answering a few key questions about your imaging needs, you can automatically narrow down your choices.

☒ **How many images per day and per year do you need to scan?** Scanners can be grouped into high-end and low-end equipment, with low-end ma-

chines processing 10 to 35 page/min. and ranging in price from \$3,500 to \$12,000. Vendors include Bell & Howell Co., Fujitsu America, Inc. and Ricoh Corp.

High-end scanners — which handle 30 to 200 documents per minute and range in price from \$20,000 to more than \$200,000 — are sold by vendors such as Improvision, Eastman Kodak Co., Recognition Equipment, Inc., Scan Optics, Inc. and Terminal Data Corp. (see product listing pages 87 and 89).

However, getting the right price/performance isn't always as simple as it seems. Just because you have high-volume needs doesn't necessarily mean you should purchase a high-end scanner. You also need to consider downtime. Two high-end scanners might offer the same

daily throughput as 10 low-end scanners, but if one of the high-end scanners goes down, you've knocked out 50% of your capacity.

Low-end scanners, on the other hand, generally require an operator, so you need to consider labor costs.

It is actually not uncommon to combine high- and low-end models to achieve the best mix of price/performance.

Also, consider the vendor's reputation and service policy. When throughput is critical, the repair policy should accommodate immediate on-site repairs and support.

☒ **Which scanners are compatible with your imaging system?** Most imaging systems are compatible with only two or three scanners. Beyond hardware compatibility, the same data formats must also be supported, including data compression, image formats and text formats. The scanner must also feed the system at the appropriate pace, since scanners can usually work faster than the imaging system.

☒ **Are your documents clean and uniform in size, or are they mixed, torn, wrinkled or nonuniform?** Manual feeders are usually recommended for documents that are very fragile, stiff or mutilated, while automatic feeders are considered faster for uniform, clean documents. Some automatic feeders can handle mixed-size documents or nonuniform ones.

Here again, the decision is not cut-and-dried. Some companies prefer manual operators to automatic feeders because they make sure documents get through the scanner and can prevent jams.

☒ **Do you need to scan two-sided documents?** "Duplexing" scanners actually contain two heads, one of which scans the top and the other of which scans the bottom of the page as it passes through. With few exceptions, including Bell & Howell, only high-end scanners offer duplex capability.

☒ **What size documents will you be working with?** There are generally three size categories: large (11- by 17-in.), document (8½- by 11-in.) and item (receipts, remittances, etc.). Be sure you consider all the document sizes you will need to scan before making your selection.

☒ **What type of image quality do you need?** Image quality is determined by two variables: resolution and gray scales (or colors). Most scanners offer a range of selectable resolutions, with 200 dot/in. being perfectly adequate in many cases. Some applications require 400 dot/in.

As with resolution, the amount of gray scales captured is usually selectable, ranging from 4-bit capture (16 levels of gray scale) to Polaroid Corp.'s 24-bit capture (more than 16 million colors). On the very low end, you can get a scanner with binary capture. Here, the scanner captures only pure black or pure white, converting photographs to clusters of black-and-white dots that make up a halftone.

Gray-scale capture preserves the continuous tone quality of photographs but at the expense of higher bytes of data.

Be warned: As resolution or gray scale increases, so do storage requirements, while system performance declines.

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IMAGING SYSTEMS PRODUCT SPOTLIGHT

VENDOR	PRODUCT	MAXIMUM RATED SPEED / THROUGHPUT SPEED ¹	HARDWARE SUPPORTED	SOFTWARE SUPPORTED	MEMORY/HARD DISK REQUIREMENTS (BYTES)	SCANNER CONFIGURATION	TYPES OF MEDIA SCANNED	TYPES OF SCANNING BEST SUITED FOR	CHARACTER RECOGNITION CAPABILITIES	MAXIMUM RESOLUTION (DOT/IN.)	FORMATS FOR SAVED IMAGES	INTERFACES SUPPORTED	WARRANTY	PRICE	MANUFACTURER
Ricoh Corp. (408) 432-8800	IS 410 Image Scanner	20/20	IBM PCs and compatibles, any Macintosh with SCSI interface, any Unix-based system	OS/2, DOS, Macintosh System 6.7, Unix	Dependent on system configuration	Flatbed desktop	8½- by 11-in. paper, legal size, checks	Document imaging systems, forms processing, image archiving, publishing	Software-dependent	400	Software-dependent	SCSI II	One year	\$6,000 includes scanner, automatic document feeder	Ricoh
	NPS 10 Image Scanner, NPS 20 Image Scanner	48/Dependent on host (NPS 10), 48 single-sided, 96 dual-sided (NPS 20, dependent on host)	IBM PCs and compatibles, any Macintosh with SCSI interface, any Unix-based system, Sun System 3, 4, Sparcstation	OS/2, DOS, DOS Windows 3.0, Macintosh System 6.7, Unix, Sun OS	Dependent on system configuration	Desktop	8½- by 11-in. paper, legal size, checks	Document imaging systems, forms processing, image archiving	Software-dependent	400	Software-dependent	SCSI II	One year	\$20,000 (NPS 10) includes scanner, \$35,000 (NPS 20) includes scanner	Ricoh
Scan Optics, Inc. (203) 289-6001	Easy Reader 1720	30/25	IBM PCs and compatibles	MS DOS, Easy Reader software	2M/40M	Desktop	8½- by 11-, 2½- by 14.2-in. paper, legal size, checks, payments stubs	Document imaging systems, forms processing, image archiving	400 char./sec. recognition speed	200	TIFF, proprietary 8mm digital videocassette recording tape	SCSI I, AT bus, Ethernet	Three months	\$85,000+ includes scanner, PC, recognition box, image capture camera, document feeder	Scan Optics
	Relia Reader	200/Varies by application	Any image, storage and retrieval platform or host processor	Relia Reader proprietary OS	NA/40M minimum	Free-standing	Up to 9- by 14-in. paper, legal size, checks, payment stubs	Document imaging systems, forms processing	2,000 char./sec. recognition speed; ASCII file formats and Multifont supported	200	TIFF, proprietary 8mm digital videocassette recording tape	SCSI I, proprietary	Three months	\$450,000+ includes scanner, PC, recognition box, image capture camera, document feeder	Scan Optics
Terminal Data Corp. (805) 529-1500	Docucan 2600 ²	40/30-40, dependent on system configuration	IBM PCs and compatibles, PS/2	DOS 3.0 or later, OS/2 1.0 or later	Dependent on system configuration	Desktop	2½- by 3-in. to 8½- by 24-in., checks, payment stubs, union skin, card stock	Document imaging systems, forms processing, image archiving, conversion service bureaus	Dependent on system configuration	200	Determined by the host	XT/AT bus, AT bus, proprietary, MCA	Three months	\$19,000 includes scanner	Terminal Data
	Docucan 2610 ²	40/30-40, dependent on system configuration	IBM PCs and compatibles, PS/2	DOS 3.0 or later, OS/2 1.0 or later	Dependent on system configuration	Desktop	2½- by 3-in. to 8½- by 24-in., checks, payment stubs, union skin, card stock	Document imaging systems, forms processing, image archiving, conversion service bureaus	Dependent on system configuration	300	Determined by the host	XT/AT bus, AT bus, proprietary, MCA	Three months	\$27,000 includes scanner	Terminal Data
	Docucan Plus 4520 ²	54/40, dependent on system configuration	IBM PCs and compatibles	DOS 3.3 or later	4M/80M	Free-standing	2.9- by 4.1-in. to 12- by 17-in. paper, legal, checks, payment stubs	Document imaging systems, forms processing, image archiving	Recognition speed dependent on quantity and quality of characters	200	TIFF, WIIS, MOD-CA/IOCA	AT bus	Three months	\$95,000 includes scanner, Docucan Plus software	Terminal Data
	Docucan Plus 4530 ²	43/35	IBM PCs and compatibles	DOS 3.3 or later	4M/80M	Free-standing	2.9- by 4.1-in. to 8½- by 14½-in. paper, legal, checks, payment stubs	Document imaging systems, forms processing, image archiving	Recognition speed dependent on quantity and quality of characters	300	TIFF, MOD-CA/IOCA	AT bus	Three months	\$95,000 includes scanner and Docucan Plus software	Terminal Data
Wang Laboratories, Inc. (508) 459-5000	SC3000	18/14	IBM PCs and compatibles	DOS 3.3 or later, Open Image software, Windows 3.0	2M/40M	Desktop	8½- by 11-in. paper, legal, checks	Document imaging systems	None	400	TIFF	XT/AT, AT bus	Three months	\$5,800 includes scanner	Fujitsu
	DS4200	35/32	WIS minicomputers	V5 Version 7.2 and later, WIS 2.6	4M/454M	Free-standing	8½- by 11-in. paper, legal, checks, payment stubs	Document imaging systems	Dependent on system configuration	200	WIFF	Proprietary	Three months	\$7,500 includes scanner	Terminal Data
	SC4000	20/8	IBM PCs and compatibles	V5 Version 7.2 and later or DOS 3.3 or later, Open Image software, Windows 3.0	2M/40M	Desktop	8½- by 11-in. paper, legal, checks	Document imaging systems	Dependent on system configuration	400	TIFF, WIFF	XT/AT, AT bus	Three months	\$8,200 includes scanner	Terminal Data
Xerox Imaging Systems, Inc. (508) 977-2000	KE 200 Document Input System	16/Varies depending on document quality	IBM PCs and compatibles	Windows 3.0, DOS 3.31 or later	1M-2M/6M	Desktop	8½- by 11-in. paper, legal size	Document imaging systems	Recognition speed varies on document quality; 6- to 24-point type size recognized	400	TIFF, Print PC Paintbrush	SCSI I	Three months	\$25,950 includes scanner, RISC processor, OCR software	Hitachi
	Scanwork	16/Varies depending on document quality	Sun System 3 and 4, SLC, Sparcstation	Sun OS 4.03, 4.1, 4.11	Minimum of 8M/25M	Desktop	8½- by 11-in. paper, legal size	Document imaging systems	Recognition speed varies on document quality; 6- to 24-point type recognized	400	TIFF, Sun Raster, Interleaf Graphics Format	SCSI I	Three months	\$17,950 includes scanner and OCR software	Hitachi

☒ **Does your scanning involve character recognition?** Your application may involve reading numbers, text and/or handwriting from scanned documents. The ability to convert bit-mapped images into computer-recognizable text is typically called optical character recognition (OCR). OCR can reside in a number of places: on the scanner, somewhere on the network as a recognition server or in the host system on a board or as software.

Because high resolutions provide more information on which the OCR engine can base its decisions, most OCR applications require 300 to 400 dot/in. input for highest throughput.

Calera Recognition Systems, Inc. and Xerox Imaging Systems, Inc. offer dedicated OCR scanners ranging in price from \$17,000 to \$32,000. Both firms also offer software-only products that can be used with other high-speed scanners.

Handwriting recognition is still mostly the realm of high-end dedicated scanning systems, such as those by Recognition Equipment or Scan Optics. Banks and credit-card companies are typical users of dedicated scanning systems that are capable of handwriting recognition.

☒ **Do you need to scan particular zones on a page?** Some scanners allow you to specify which areas of the

document you need scanned, reducing the amount of data to be stored. The number of areas, or zones, your scanner accommodates depends on the processing software included with the scanner.

☒ **Do your images need cleaning up before scanning?** Some scanners offer built-in image processing or optional image-processing boards, which automatically improve image quality through features such as sharpening, noise removal, brightness and contrast control. This increases throughput.

☒ **What are your growth plans for the imaging system?** The scan-

ner that seems appropriate today may not be the wisest choice in the long term. In the end, you may find that a mix of scanner models is the best solution.

Down the road, every scanner application need will be easily met with an appropriate input device, including color. Polaroid recently introduced a color snapshot scanner designed for photograph management applications such as insurance claims processing.

Over the next 12 months, you can expect to see at least two new duplexing scanners, some new dedicated OCR scanners and a wider variety of performance options. Lower cost, faster models will also become available. •

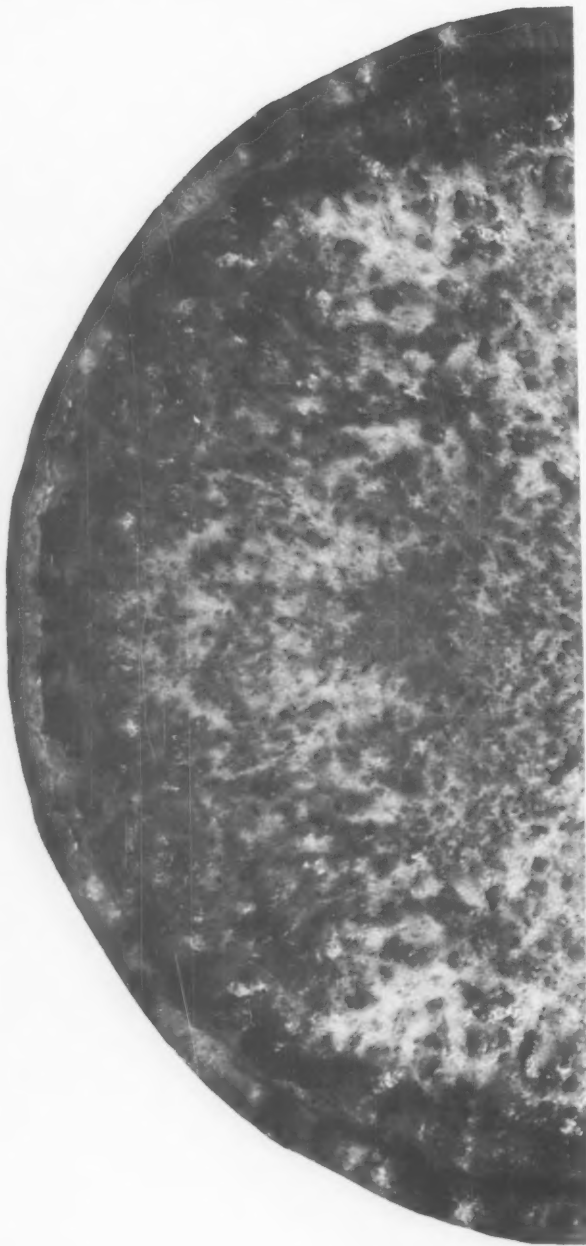
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Together at last

Strategic systems development uses information engineering techniques to break down barriers between strategic planning and systems development

Editor's The concept of information engineering was first introduced to Computerworld readers in May and June of 1981 through a series of six In Depth articles by Clive Finkelstein, the originator of the methodology. In those articles, Finkelstein described for IS managers this new approach for building information systems based on corporate strategic plans.

With 1991 marking a decade since the series ran, we thought it might be time to have Finkelstein, founder and chief scientist of Information Engineering Systems Corp. in Alexandria, Va., revisit the concept. In the following pages, he gives his view of directions information engineering will take into the 21st century, as detailed in his book *Information Engineering: Strategic Systems Development*, to be published by Addison-Wesley Publishing Co. in early 1992.

BY CLIVE FINKELSTEIN

One of the shortcomings of traditional corporate strategic planning methods is the difficulty of communicating to everyone in the organization what management's goals are. As management professor William Halal notes in his book *The New Capitalism*, "Corporate planning has been translated into an empty paper chase which consumes management time but has next to no impact on real decisions." According to Halal, only 10% of all U.S. companies with strategic plans use them effectively.

Information systems development is also beset with communication problems, which are most commonly reflected in the poor definition of user requirements and, subsequently, the creation of ineffective systems that fail to meet users' needs. There are few IS managers who have not heard those nerve-racking words: "The system is fine, except..."

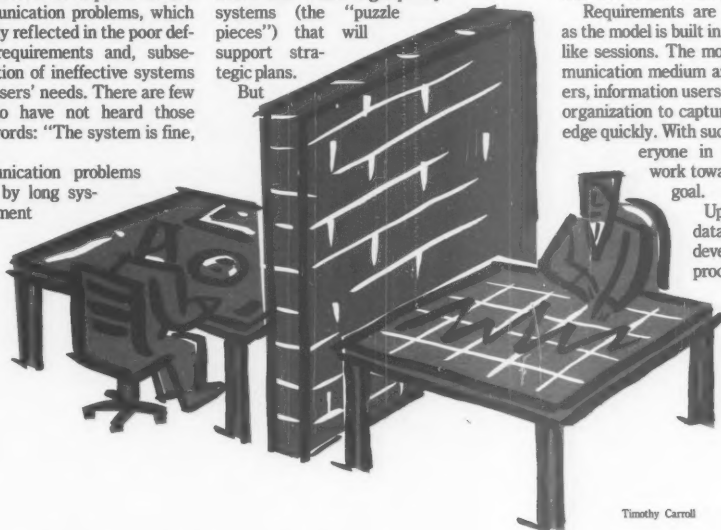
These communication problems are compounded by long systems development

lead times, which are simply incompatible with the rapid pace of change and competition today. Often, both user needs and the organizational environment have changed before systems are finally delivered.

The upshot of these problems is that in many organizations, investment decisions about hardware and software are made without an understanding of the strategic priorities of the business. It's like trying to do a jigsaw puzzle without seeing the big picture.

Management must be able to communicate its vision more effectively throughout the organization so that all levels can see the entire "jigsaw puzzle." For its part, IS needs to obtain precise and accurate user requirements and create high-quality systems (the "puzzle pieces") that will support strategic plans.

But



Timothy Carroll

strategic planning and systems development are disciplines that historically have been applied independently of each other. For organizations to compete in the 1990s and beyond, they must merge strategic planning and systems development into what is known as strategic systems development. Through strategic systems development, IS managers can provide their organizations with quality, business-targeted systems that readily adapt as the company changes.

Information engineering revisited

Organizations can achieve strategic systems development today using "business-driven information engineering," also known as "enterprise information engineering." Business-driven information engineering is a rigorous set of integrated tasks and techniques that guides the organization from strategic planning to the implementation of information systems.

Business-driven information engineering starts with the strategic business plans set by management. It encompasses these plans in a model that addresses first data (what information structure is needed), then process (how it will be provided). This sequential approach is critical because an organization's data structure tends to remain stable, while processes needed to derive that information are more volatile.

Business-driven information engineering is applied by a cross-section team of business managers, information users and IS staff. The team, in effect, creates a graphic representation of the business plan.

Requirements are captured dynamically as the model is built in structured, workshop-like sessions. The model becomes the communication medium among business managers, information users and IS and enables the organization to capture its collective knowledge quickly. With such a "map" in hand, everyone in the organization can work toward a common business goal.

Upon completion of the data model, the team can develop business-driven process models. These are

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Continued from page 91

put together by analyzing the internal and external business events that will trigger the need for information and depict steps required to gather and disseminate that information. These data and process models are linked to form objects that allow for easier and more precise systems design and implementation.

Armed with a business model whose requirements are based exactly on management input, IS can quickly develop a complete set of specifications for selected operational areas. Through the model, IS defines opportunities for data sharing.

Database and applications designs can then be coded for the correct environments, tested to ensure that system interfaces and internal logic are correct, loaded with initial data values where appropriate and documented to ensure usability and maintainability.

Resulting systems manifest themselves as core business systems, executive information systems and decision-support systems. They may be implemented as centralized or distributed databases using relational or non-relational database management system products. Systems are object-oriented and may be implemented with object-oriented languages or third- or fourth-generation languages.

Once the organization has acquired information engineering skills and performs strategic systems development, the methodology should be institutionalized. In this way, there will be a step-by-step method to assist strategic planning and encompass all levels of an organization, with strategic modeling representing the scope of the enterprise from a senior management perspective and tactical and operational modeling representing the specific requirements of the middle and operational management layers.

Systems will exhibit a higher level of quality than is achieved by traditional development methods because the systems are defined with this management perspective.

The strategic data model

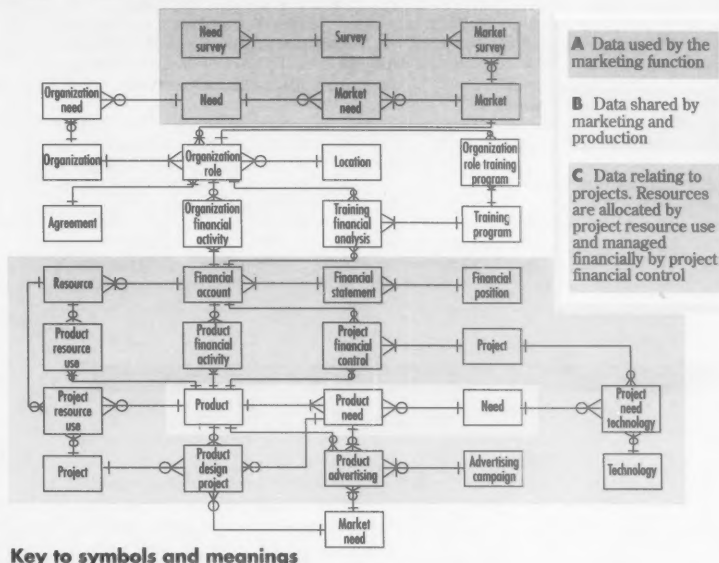
A completed business model captures text planning statements for the strategic, tactical and operational levels of an organization and offers a graphical representation of the business' overall needs (see chart above). The strategic model provides the holistic puzzle picture; tactical and operational models are the pieces that fill in definition and detail for priority areas of the business.

For example, a company might start with these three levels of management statements to build its model:

- Strategic: "XYZ Corp. must conduct a needs survey of its de-

Strategic data map

The map can be used to evaluate different organizational structures as well as to identify company functions responsible for specific data



Key to symbols and meanings

- +—: The data entity at the opposite end of the association must be associated with one and only one occurrence of the entity at this end of the association.
- K—: The entity at the opposite end of the association must be associated with at least one occurrence of the entity at this end of the association.
- : The entity at the opposite end of the association may be associated with one and only one occurrence of the entity at this end of the association.
- K—: The entity at the opposite end of the association may be associated with zero, one or many occurrences of the entity at this end of the association.
- : The entity at the opposite end of the association will eventually be associated with one and only one occurrence of the entity at this end of the association.
- K—: The entity at the opposite end of the association will eventually be associated with at least one occurrence of the entity at this end of the association.

Source: Information Engineering Systems Corp.

CW Chart: Janell Genovesi

defined market to determine the opportunities for current and future product sales."

- Tactical: "XYZ Corp. will conduct one needs survey per month on different product lines to keep its market needs assessment information as current as possible."

- Operational: "Each telephone survey will be conducted between 6 p.m. and 9 p.m. customer local time."

The model represents an opportunity to redesign the business and build systems to support the organization dynamically, and it can be used to evaluate organizational structures (see story page 95). By zeroing in on sections of the model, a company can determine which functions of the organization are responsible for different data.

For example, a firm's marketing function, at a strategic level, can be depicted as a data model (see chart, section A). It shows graphically the marketing function's responsibility for collecting data on the firm's marketplace and its customers' needs.

This company's market has many needs (as represented by the information engineering line symbols), which are determined through market surveys and need surveys. These products and services are represented by

the PRODUCT entity seen in section B of the chart.

This model shows that a need may be satisfied by many products. A product may satisfy not only the needs specified but also many others.

Section B, therefore, graphically depicts the following text planning statements:

- Each PRODUCT will fulfill one or more NEEDS for that product.
- Each identified NEED may be fulfilled by zero, one or many PRODUCTS.

The intersecting entity PRODUCT NEED in section B presents the opportunity to match needs to products and to represent occurrences of the match. The data model fragments seen in sections A and B of the chart are all of interest to the marketing function and suggest that systems might be needed to support a NEED SURVEY, MARKET SURVEY and MARKET NEED ANALYSIS.

These systems will require the capability to capture the needs of the defined market and match existing opportunities to existing products. They will also have to identify needs that the organization is not currently meeting for its defined market. With these capabilities, the defined system should help deter-

mine current and future sales and product development opportunities.

Note that through the NEED entity, the marketing function obviously requires information on PRODUCT as reflected in sections B and C. By looking at the map and realizing that the PRODUCT entity is central to the marketing, research and development and finance departments, it becomes evident that all these departments can and should share data to avoid unnecessary system redundancy and reduce maintenance efforts.

The model is important for examining the different business functions and allocating responsibilities for gathering and maintaining data on the entities needed by multiple functions. While it is reasonable to assume that the marketing department will maintain the data in the ADVERTISING CAMPAIGN entity, the department to handle data for the PRODUCT entity may be much less clear. This points out the critical need for a data administration function that crosses departmental lines.

The model in section C also allows management to think through alternative strategies. For example, with regard to the company's FINANCIAL POSITION, a certain amount of RE-

SOURCE must be allocated to each PRODUCT ADVERTISING budget based on the return on investment from the ADVERTISING CAMPAIGN.

Appropriate business rules, audit triggers and other controls can be built into the system based on the associations among entities. A variance report could reflect the need to take action if the PRODUCT FINANCIAL ACTIVITY falls below a specified percentage of the prior year's sales.

When reviewing a data model, what is missing is just as important as what is there. The omission of expected associations among related entities may indicate missing audit controls, missing information that a function needs or lack of communication among departments that should be coordinated. This analysis of the data model can result in the company's taking corrective action.

Process models next

Upon completion of a documented data model, the information engineering team builds process models that reflect business activities. These models show the steps required to gather and distribute information needed to accomplish those activities.

What business-driven process modeling does is identify for each data entity generic procedures that contain logic to perform Create, Read, Update and Delete data access processing. When the data entities from the data model are combined with these generic procedures, they form an object. Because of the detailed business definition of data in the data model, these objects contain the detailed logic for all data access processing.

The result is the design of object-oriented systems that incorporate a high level of business expertise. Business changes can be made quickly and easily.

That's because objects inherit the definition and logic of entities defined at higher tactical and strategic levels and are linked together based on defined business conditions. They encapsulate the logic of lower level operational entities. The business conditions are implemented not as conditional logic on programs but as conditional data in databases accessed at the moment a program is initiated and brought into memory for execution.

When the business rules or conditions change, these changes are applied directly to the business condition data as easily as changing a customer's address in a customer database.

The data map of entities and the association lines between them also represent logic objects and the alternative access paths joining them. An infinite number of business events and processes can be defined as access paths through a data map. These are

Continued on page 94

Continued from page 93

stored as data able to be changed instantly and take effect immediately — eliminating slow, expensive, error-prone program modifications.

Objects represent pieces of logic that can be put together like building blocks. The stored business condition and access path define how the objects are joined together and their sequence of execution. Each combined group of objects represents a business event, such as the addition of new data to store market survey responses in order to determine market needs. This logic can be included with other combined logic, such as for the retrieval of products that satisfy those needs. This can be stored as added data for a new advertising campaign, for example.

Using objects results in a dramatic increase in the speed of delivery and the quality of the systems that are designed by the IS/business design partnership. Such systems are able to be built in days or weeks rather than months or years. The higher quality of databases and systems defined by users and the ease with which they can be changed translates into lower maintenance work loads, allowing IS to spend less time on maintenance and more time building systems.

Completing the puzzle

Organizations undertake large systems development projects not because they expect to be the same tomorrow as they are today. Rather, they know that as the organization and its strategic plans

evolve, the business will move in new directions and will need different information. As a result, the firm will require new processes to manage that data and support the execution of those plans.

If the existing data architecture cannot be adapted easily to new data and processes, such change or the integration of separate applications databases and systems will be difficult.

The companies that will excel and have competitively superior information systems will be those that can capture strategic plans and translate them directly into systems. Those organizations that continue to develop systems using traditional methods will find themselves continually trying to put together a complex puzzle without seeing the overall picture. •

UDS V.32 Modems: winners at 19.2 kbps—now FastTalk doubles the speed



From the day of its introduction, UDS' V.32 modem has gathered honors from leading computer publications and other industry watchers!

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No need to await finished model

A common misconception about corporate data models is that they must be done at an enterprise-wide level before they can be put to use.

However, priority systems — those the company needs *now* — can be implemented long before the corporate data model is finished. Furthermore, those priority systems will fit precisely in the corporate data model.

The only limitation to developing systems for priority areas is the amount of human resources available.

Say, for example, management determines that its most strategic business need is to improve customer service. It can establish a project team of customer service experts and IS professionals at the tactical level of the organization to develop a detailed tactical model. The team then completes a more detailed analysis at the operational modeling level.

The three levels of management statements needed to build the model might be represented by the following:

- **Strategic:** ABC Retail must improve customer service.
- **Tactical:** ABC Retail will decrease by 30% the amount of time customers wait in line to pay.
- **Operational:** ABC Retail will implement a bar-code system.

These statements can be modeled and built into systems that support them.

As the model is added to and refined, the team can ensure consistency and integration by tying each entity and supporting business statement into the next higher level. Operational statements and models must be fully supported at the tactical level, and tactical statements and models must be completely supported at the strategic level.

The corporate data model expands progressively as levels of detail about the project are refined by business input.

Concurrent or subsequent models (and systems development projects) use the same methods to define and implement operational databases, reusing existing models' data designs and process logic.

The result is early delivery of priority systems by accelerating them through the process rather than awaiting organizationwide tactical and operational modeling.

Not only are systems delivered faster and with greater business precision, but as more projects move through to operational detail, there is also a progressive evolution of the corporate data model.

CLIVE FINKELSTEIN

Visualizing how corporate change affects data needs

Business models provide stable foundation for organizations when they restructure

BY CLIVE FINKELSTEIN

The ability to adapt to change is the single most important determinant of corporate survival. As an organization changes and evolves, firms must be able to restructure not only databases and systems but also their organizational structure. The goal is to work toward greater operating efficiencies and better use of resources.

The business model is a vital cornerstone that provides stability in an environment of rapid change. It is the medium that enables management to evaluate the most appropriate organizational structure for achieving a strategic plan. It also enables information systems to determine the database and systems designs necessary to support that organizational structure. It is imperative to maintain and update the

THE OPTIMUM organizational form through the late 1990s and into the 21st century will be a matrix structure.

business model to have it remain an accurate reflection of how the business can and should operate.

Typically, companies evolve (sometimes over decades) into the following basic organizational forms:

- **Entrepreneurial.** Usually the form a start-up company takes, entrepreneurial setups tend to have an informal management structure, with all employees reporting directly to the chief executive officer.
- **Bureaucratic.** This form is more centralized, with analytic or directive management. Controls are put in place to achieve greater operating efficiencies (see chart at right).
- **Divisional.** As the bureaucratic organi-

zation grows, lower level executives with more knowledge than top management of operations and markets demand greater freedom in decision-making than that offered by the centralized hierarchy. This leads to a divisional structure in which plant and market territory managers are given greater responsibility, which tends to result in strong market expansion.

In time, when senior managers in this divisional structure feel they are losing control over diversified operations, they attempt to regain control through strategic business units or product groups.

- **Coordinated.** Centralized control is retained with strategic business units and product group structures, but decision-making is decentralized. Autonomous field managers are required to coordinate plans, money, personnel and technology with the rest of the organization.

- **Matrix.** While the divisional and coordinated structures have been widely used, they do not have the kind of speed demanded by today's competitive environment. The organization, therefore, must transform itself again. The optimum organizational form through the late 1990s and into the 21st century will be a participative or matrix structure (see chart below). This is a flatter organization, with self-managed teams and fewer middle managers.

With a business model, a company can visualize how changes in its business strategy and organization will affect the information needs of users. If a company moves from a bureaucratic organization to a divisional one, it may need to get lower level executives access to more operational and marketing data.

Databases and information systems that are developed based on a data model will be able to survive corporate restructuring by reassigning data access and stewardship responsibility to those with a "need to know" in the new structure.

This flexibility enables a company to match the business model to the organizational setup. For example, the PRODUCT

data entity in section B of the chart on page 93 can be tied directly to the production function in the bureaucratic organization. Alternatively, this model subset could be linked in a divisional or coordinated structure, depending on where the responsibility for the data resides.

Likewise, a data model relating to projects (see section C of chart, page 93) can form the basis for a system to support product development teams in a matrix organization. A product development team

sources: people, equipment and funds. This is the responsibility of the PROJECT RESOURCE USE data entity, which is designed to capture occurrences of each resource — employee hours or equipment and so on — on a specific project and connect the data to a product development project.

The PROJECT FINANCIAL CONTROL data entity will capture all direct and indirect costs to ensure that the project stays on budget. It also provides an

The bureaucratic firm

This setup is highly centralized, with top management having control



Source: Information Engineering Systems Corp.

CW Chart: Marie Haines

might define this data model subset based on a need for a project management system.

As the model shows, the system can capture and share information among the marketing, production and administrative staffs, as well as the project team.

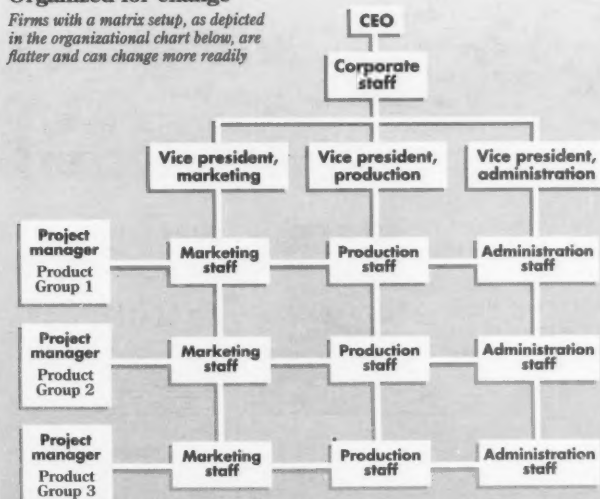
Specifically, projects require re-

early warning if the project is close to exceeding its predetermined cost.

A matrix organization could use the resource and financial areas of the strategic data model to establish and manage projects by capturing data on the projected resource use and tracking that against the actual use of resources. •

Organized for change

Firms with a matrix setup, as depicted in the organizational chart below, are flatter and can change more readily



Source: Information Engineering Systems Corp.

CW Chart: Marie Haines



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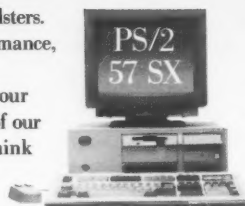
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COMPUTER INDUSTRY

NATIONAL BRIEFS

Going, going... public

► With a scant three weeks left in the 1991 initial public offering season, Hambrecht & Quist, Inc. and Morgan, Stanley & Co. took Retix public last week at \$9 a share. Based in Santa Monica, Calif., the company offers networking products aimed at allowing otherwise incompatible equipment and applications to interoperate on local and wide-area networks.

Bad to worse

► During the past year, financial results from international operations, once the bright spot on computer firms' quarterly earnings reports, began to turn on the firms that recently depended on them for a boost beyond the domestic recession. Now comes a chilling note from Wall Street: We ain't seen nothing yet. "We are shocked by the results of our latest [October] international survey," said a report from Paine Webber, Inc. The survey contradicts popular opinion that the weak international picture is already reflected in technology stocks.

Upbeat

► Downward trends notwithstanding, ill winds from overseas will not blow away every computer company bottom line this year. Networking player Novell, Inc. last week posted 1991 profit up 72% to \$162.5 million, as annual revenue increased 29% to \$640.1 million. International revenue, Novell said, contributed 44% of total sales.

Different strokes

► How much does top management care about product innovation, and what prevents firms from attaining it? Plenty — and different things on different continents, according to a survey recently published by management consulting firm Arthur D. Little, Inc. Executives at the 701 surveyed firms, which spanned nine industries in the U.S., Japan and Europe, overwhelmingly said they saw innovation as a key issue. But opinion varied widely when it came to targeting barriers. In Japan, 91% of the respondents pointed to poorly communicated vision and goals as the biggest block to product innovation. U.S. and European firms blamed "lack of skilled leaders" (61% and 54%, respectively).

AST bids for the big time as market leaders suffer

BY PAUL GILLIN
CW STAFF

IRVINE, Calif. — Five years ago, Dow Jones & Co. broke with tradition and began buying non-IBM personal computers. Replacing IBM equipment at the publishing company were machines from AST Research, Inc.

Today, Dow Jones buys nearly all of its PCs from AST. The buyer gets premium-brand quality at lower prices and with better service, according to Dow Jones senior buyer Rich Widman. "They stand behind their box, resolve issues, and they don't point fingers," he said.

Nevertheless, Dow Jones is now seriously considering the low-priced Gateway 2000 as an AST alternative.

"We're constantly looking at the other boxes," Widman said. Although Gateway is unlikely to supplant AST as the PC of choice, "it looks like a contender," he said.

The Dow Jones story sums AST's five-year rise to fortune in the PC systems market. At one time a builder of add-in memory and communications cards, AST has recently broken onto many information systems buying "short lists" as a PC maker with a reputation for quality equipment and service at prices that undercut IBM and Compaq Com-

puter Corp. prices 10% to 20%.

In the meantime, its revenue since 1987 has tripled to nearly \$700 million in the most recent fiscal year. AST was the top-performing stock on the NASDAQ exchange in 1990, with a 259% total return.

However, the discount blues that swamped Compaq earnings last quarter also caught AST in the undertow. Faced with newly aggressive competition from above and cutthroat price-cutting from below, AST announced that it would have to cut its own

margins to stay competitive. Its stock plummeted amid a broad high-tech sell-off and now trades at only half its 52-week high.

Is AST in for the same kind of crash that felled Compaq this fall? Most observers do not think so. "AST is a well-managed company in a growth market that is being squeezed a little bit right now," said Frederic Cohen, se-

In the future...

There may be a minicomputer maker in AST's future. Nearly a year ago, the company first disclosed its interest in buying a minicomputer maker to shore up its multiuser product line and reseller network. Time has not dimmed the fires. AST today sits on \$140 million in cash and has an in-house task force dedicated to finding acquisition candidates. "We are always in discussion with a few companies," AST co-founder Tom Yuen said. "Today, a lot of the minicomputer companies are very cheap."

However, Yuen said he does not think the market has bottomed out. "If we jump now, we may pay too much," he said. When AST does jump, it may not be for a major player. While he would not name candidates, Yuen said MAI Basic Four, Inc. is an example of a minicomputer maker that is spending money now to move from proprietary to open platforms.

AST, he said, is already there.

PAUL GILLIN

Leasing practices suit yields victory for IBM

BY NELL MARGOLIS
CW STAFF

BOSTON — A third-party computer leasing company that tried to give IBM a taste of its own legal medicine instead found itself having to swallow a bitter pill last week when a Massachusetts federal court ruled in favor of IBM.

The ruling against plaintiff Computer Services of America, Inc. (CSA) came days after the Delaware Chancery Court denied computer leasing player Comdisco, Inc.'s motion to dismiss the reconfiguration practices suit filed early this year by IBM and its leasing and finance subsidiary, IBM Credit Corp. That case, which is now in the discovery phase, appears to be headed for trial.

The Comdisco case has caused a furor among third-party lessors, many of which saw it as an attack on long-accepted reconfiguration practices and, as such, as an IBM attempt to dismantle the third-party industry that relies heavily on the ability to upgrade and downgrade IBM machines.

One of the key controversies sparked by the IBM/Comdisco legal hostilities revolves around IBM's position on lessors' and sublessors' duty to restore a reconfigured IBM computer to its original status when the machine comes off lease and is returned to IBM. It contends that this duty includes

replacement of the identical removed parts, as opposed to substantial equivalents — i.e., literal replacement instead of the commonly accepted "like-kind" replacement.

Since the battle was first joined last winter, a third-party contingent has contended that IBM does not play by the strict replacement definition it seeks to impose on its leasing competitors. CSA, however, has not turned out to be their case in point.

In this case, CSA leased an IBM 3090 Model 200 to Portland, Maine-based insurance company Unum Life Insurance Co. During the course of the lease, the machine went through three upgrades traversing three technologies, leaving it a constructive 3090 600J.

When the lease ended, Unum, in conjunction with IBM, restored the machine's base 3090

200 parts before returning the computer to CSA. A "donor" base of 200 was used for restoration.

CSA argued that the interim internal components — which, being of more recent technological vintage, were more valuable — had become a part of the machine and should have been left with it. Federal Judge Rya Zobel disagreed.

"It's interesting that a substitution of parts issue was won by IBM here, when they're arguing in the Comdisco case that like-kind substitution should be prohibited," noted Thomas Donovan, an analyst at Framingham, Mass.-based market research firm Technology Investment Strategies Corp.

However, said one third-party leasing firm executive who testified at the trial, IBM may stand to gain from comparisons drawn between the CSA case and the pending Comdisco suit.

IBM, Unum and CSA could not be reached for comment.

AT A GLANCE AST Research, Inc.



Tom Yuen

- Founded 1980
- Employees 3,000
- Headquarters Irvine, Calif.
- Fiscal 1991 sales \$688.5 million
- Manufacturing Fountain Valley, Calif.
Taiwan
Hong Kong

CW Chart: Marie Haines

nior analyst at Martin Simpson & Co. "But they have a long history of moving ahead of the competition."

AST has a record as a survivor. Founded in 1980, it prospered selling expansion boards until that market began to dry up. AST shifted gears into the crowded PC market in 1987.

That business was not nearly so kind. AST had to build brand-name recognition in a field of hundreds of clone makers. It reported its first loss in January 1989 and laid off 6% of its work force.

Since then, however, just about everything has gone right. At the same time as it was laying off employees, AST began shipping a new line of upgradable PCs. The Cupid architecture was a hit with buyers worried about obsolescence. "You can upgrade from a 16-MHz to a 25-MHz machine in about 15 minutes, and that includes shaking hands with the user," Widman said.

Continued on page 100



CEOs seek to broaden federal computing plan

Program would create national high-speed data net, fund development of supercomputers

BY GARY H. ANTHERS
CW STAFF

WASHINGTON, D.C. — Having worked for several years to help establish a federal program in high-performance computing and communications, the U.S. computer industry is now seeking to broaden the Computer Systems Policy Project's (CSPP) scope and reorder its priorities.

The CSPP, a coalition of chief executive officers from 12 large U.S. computer firms, met recently with Office of Management and Budget (OMB) Director Richard G. Darman and recommended that the program be broadened to include social and economic thrusts with wide popular appeal.

Its proposed five-year program would help create a high-speed nationwide data

600-member association of colleges and universities with interests in information technology.

According to Roberts, appropriating the money earmarked in the bill may be difficult. In any case, he said, just accomplishing the program's existing goals will be an ambitious undertaking.

"It's very well-intentioned, and at the margin it might do some good," Roberts said of the CSPP initiative. "But it's also a bit of an unguided missile."

According to Compaq Computer Corp. President Eckhard Pfeiffer, who attended

the White House meeting, "The response was very positive. The reception by OMB was extremely favorable."

However, a congressional source close to the federal program expressed some doubt that the administration will want to see the initiative expanded further. Bush advisers, the source said, balked earlier at including programs such as health care and electronic libraries as unwarranted intrusions by the government in areas best left to the private sector.

Nevertheless, the source said the CSPP proposals would be generally well-

received on Capitol Hill and would likely find their way into new legislation next year.

Kenneth Kay, executive director of the CSPP, said the real test will come when the president submits his budget proposal to Congress next February. "We'll focus on the FY93 budget proposal and see how far we get," he said.

CSPP's report to the White House does not specifically call for stepped-up federal funding for the program, but according to Apple Computer, Inc. Chairman and CEO John Sculley, additional spending would be needed for the program to fully achieve its objectives. The bill just signed by the president earmarks \$1.9 billion in new funding for the program, bringing total federal spending

Proposed agenda

Technical and policy considerations for the National Research and Education Network

- Coding schemes and protocols for interoperability.
- Broad accessibility by disparate user communities.
- Security and privacy of data and files.
- Protection of copyrights and royalty rights.
- Allocation of radio spectrum for network use.

Source: Computer Systems Policy Project

network for research and education and would fund development of supercomputers many times faster than those in use today. The administration-backed initiative is outlined in legislation that was approved by Congress three weeks ago and signed by President Bush last week.

Geared to scientists

As originally conceived by Congress, the program would be geared to scientists and engineers working in relatively esoteric areas such as semiconductor design and genetics, CSPP officials said. CSPP would like to see generic technologies developed as part of the program and applied to problems in health care, education and services to the disabled.

Similarly, CSPP recommended that the proposed National Research and Education Network, which is at the heart of the initiative, be expanded beyond the government and university laboratories traditionally served by federal networks in order to bring "educational, health, social, business and entertainment services to households, schools, hospitals and offices across the U.S."

CSPP said this "network of networks" would be developed and deployed by the private sector, with government and industry working together on a number of technical and policy issues (see chart).

At least one veteran participant in the development of the government's existing initiative was unimpressed with the CSPP proposal. "If they had just read the bill, they'd know that the whole thing has been substantially broadened over the last couple of years and it's not just a supercomputer bill," said Michael Roberts, vice president of networking at Educom, a

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on high-performance computing and communications to some \$4 billion over five years.

Sculley said the computer industry has its eye on a greater share of the \$70 billion spent each year by the national laboratories on research. He said that only 2% of that goes to information technology, compared with 25% of a comparable private-sector research investment.

CSPP's report recommended that the program expand its current focus on massively parallel supercomputers to include a broad range of high-performance computers such as workstations and hybrid architectures. CSPP also said the program should devote more resources to software and to the application and dissemination of new technologies.

Software inspection at Maxwell newspapers the biggest ever

BY RON CONDON
IDG NEWS SERVICE

LONDON — A surprise software inspection mounted last month against the late Robert Maxwell's Mirror Group Newspapers (MGN) is said to be the largest and most extensive such raid to date.

Twenty-eight people swooped down on MGN's London offices and spent nine hours checking for illegally copied software. They also went to the offices of *The*

European newspaper and to two other Maxwell publications.

The raid was organized by the Business Software Alliance (BSA) and the Federation Against Software Theft (FAST). BSA is a worldwide body funded by seven U.S.-based multinational software companies. FAST is a British organization with 150 members.

The Mirror Group raid was made on behalf of five BSA members — Aldus Corp.; Autodesk, Inc.; Lotus Develop-

ment Corp.; Microsoft Corp.; and Wordperfect Corp. — and two nonmembers: Central Point Software, Inc. and Symantec Corp. The software publishers said that on the evidence of the raid, they are confident that their suit against the companies for copyright infringement will be successful.



The Maxwell companies deny the charges.

"We announced in July that we would continue to bring cases against major corporations where we obtained strong evidence of widespread illegal copying. Today's announcement is a direct result of these continuing investigations," said Bradford Smith, European counsel for the BSA.

Smith said two court orders prevented the Maxwell companies from deleting evidence or making use of any of the copied software. He added that certain laptop and desktop machines had not been available to the inspectors and that the Maxwell companies had until Monday to provide a software audit of those machines. Statements outlining the full allegations would be made next week, he said, and the case would probably go to court early next year.

The action is part of a campaign to inform companies and their directors of the consequences of software piracy, which has been a crime since the passing of the 1988 Copyright, Design and Patents Act. Nevertheless, the software industry loses an estimated \$500 million per year in the UK alone through illegal copying, according to BSA figures.

Condon is London correspondent for the IDG News Service.

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INTERNATIONAL BRIEFS

Central plan

► Two weeks after taking over the daily management of Ing. C. Olivetti & Co., Carlo De Benedetti, whose industrial group owns 42% of the Italian computer firm, has announced a reorganization that will centralize decision-making. Under the plan, slated to take effect in January, the four independent companies that made up the old organization founded by Vittorio Cassoni will be consolidated into three divisions, according to a report in the European business press.

Plummeting profits

► **Toshiba Corp.**'s profits for the first half of fiscal 1991 plummeted 63% to \$199 million on six-month revenue up 1% over last year to \$17.2 billion. The company attributed the disappointing results to the worldwide slowdown in semiconductor memories and computers, as well as to recessions in the U.S. and Europe and a falloff in Japanese private-sector investment, a report in last week's Asian business press said.

On the road again

► Spain's state-controlled **Telefonica de Espana SA** will invest \$285 million next year to develop its mobile telephone systems, which currently account for an estimated 80% of the country's mobile phone market, the firm announced.

AST Research bids for big time

CONTINUED FROM PAGE 97

AST also caught the notebook computing wave at the right time and has managed to stay ahead of price/performance curves and its competition. In just over a year, notebooks have gone from 0% to 33% of the company's quarterly revenue.

AST co-founder and Chief Operating Officer Tom Yuen disputed assertions that AST is vulnerable to cost pressure. Because the company does all of its own manufacturing and spends heavily on research, "Our advantage is higher reliability at lower cost," he said. "We design value-added performance on top of industry standard design with prices compara-

ble to mail order."

At the same time, AST has avoided slipping into the "dealer-only" distribution hole that tripped up Compaq. The company was selling actively through the reseller and systems integrator market as early as 1982 (Compaq started direct reseller sales only this year) and its PCs are re-labeled by 15 manufacturers, including Digital Equipment Corp. and Tandem Computers, Inc.

AST has also scored big against the clone makers in the area of support. "I almost feel like the Maytag repairman with respect to AST machines," said Dale Ma-

dera, a support engineer in the IS department for the state of Washington. "As far as functionality and reliability go, there's just about nothing I don't like about them."

"AST is up there in quality with IBM and Compaq, and they're the only vendor I know that offers coast-to-coast customer telephone support," said Scott Stein, director of end-user computing at Technology Investment Strategies Corp. in Framingham, Mass.

Lean margins no hardship

While observers said they think AST could be in for pressure from a slimmer Compaq, a restructured IBM and aggressive clone competition, the company is more accustomed to the leaner margins

Duly noted

AST's entry into the notebook computer market has borne early fruit



Source: Computer Intelligence/Infocorp

that a price war demands. Its gross profit margins usually hover at about 30%, compared with nearly 40% for Compaq. And since AST bit the bullet on reseller sales a long time ago, it does not bear Compaq's burden of having to develop that channel.

AST also thinks it has a few technology tricks up its sleeve that will move it ahead of the big guys. According to Yuen, AST's notebook experience has introduced it to technology that will find its way to the desktop. He said AST's future PCs will include "ergonomic improvements" sparked by notebooks such as sleeker profiles, flat-panel displays, more modular expansion chassis and enclosures that do not need noisy cooling fans. AST is also hot on multimedia and plans to build high-resolution displays, sound and voice activation into future systems. However, Yuen said the company will wait for multimedia standards to settle first.

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Branching out

With increased competition and leaner IS budgets squeezing its mainline business market, AST has diversified. In August, it branched out on both ends with a new line of low-cost systems aimed at consumers and a pricey workstation for computer-aided design users.

What has drawn more interest recently has been AST's disclosure that it is working on a multiprocessing server, an answer to Compaq Computer Corp.'s Systempro.

The product is due in the first half of next year, but AST officials said Compaq's troubles getting Systempro off the ground have taught them to keep expectations modest. "We're going to be careful we don't throw a lot of money into something that's going to get us a gold star but no customers," said H. Michael Morand, vice president of marketing.

"I tell people in the multiprocessor group not to look for a high-volume product for at least two years," said Tom Yuen, an AST co-founder.

Unlike Compaq, AST plans to rely on value-added resellers (VAR). AST will also offer minicomputer VARs incentives to port their applications to the high-end server.

PAUL GILLIN

COMPUTER CAREERS

Outside work OK if you ask

BY ALICE LAPLANTE
SPECIAL TO CW

With the economic picture refusing to brighten, IS managers and personnel consultants say that working sideline jobs may become a more mainstream trend among information systems professionals.

"In a recession, you always see a surge of moonlighting activities," says Andy Spohn, president of The Human Resources Partnership, a personnel consulting firm based in Summit, N.J.

There are a couple of reasons why employees may be particularly interested in taking on outside work during economically troubled times, Spohn explains. One is to save up extra money to cover possible weeks or months of unemployment; and the other is to cultivate professional contacts, in case they need to find a job quickly in the near future.

Even in brighter times, IS workers may also consider extra work because they feel they can pick up valuable skills or training they can't get in their full-time jobs.

"If you are stuck maintaining a payroll system, and you want to learn how to put together a marketing application, for example,

that is an excellent reason to moonlight," says James Kerwin, corporate director of information systems at Johnson Controls, Inc. in Milwaukee.

If you are among those who are thinking about taking on an after-hours job, there are some things you need to consider.

The chief concern IS managers have regarding moonlighting is whether employee productivity will suffer on the job due to outside activities. Complicating this is the fact that the recession has caused many IS shops to reduce their work forces — leaving a heavier burden on the shoulders of those left behind.

"MIS shops have pared down enormously in this recession, and most remaining workers don't have the energy to satisfactorily complete their own work plus a sideline job," says Pete Bradshaw, president of Organization Consultants, Inc., a human resources firm in Charlotte, N.C.

Don't abuse it

Few firms have formal guidelines regarding moonlighting, but most IS managers we spoke with say they allow their employees to take on external projects unless

the privilege is abused. They also had very firm ideas about what is and is not acceptable. Following are some of the absolute no-no's:

- Performing moonlighting work on company time.

- Using company hardware, software, accessories or other corporate resources to complete outside work.

- Receiving an excessive amount of phone calls related to moonlighting activities.

- Leaving the workplace to fulfill outside work commitments during working hours.

- Allowing outside work to affect performance or productivity.

Confidentiality of information is the primary concern at First Commerce Corp. in New Orleans. The bank only forbids moonlighting if it conflicts with general banking confidentiality issues, according to Kenneth Himel, vice president of technical services at First Commerce.

Bank management is concerned that sharing of information could violate customer or bank confidentiality principles or even hurt the bank's competitive standing, Himel says. "It would be okay for an employee to take on extra work that didn't violate

these concerns."

Kenneth Krallman, MIS manager at Carleton Technologies, Inc. in Orchard Park, N.Y., says he worries about overlap between jobs. "However, if they can keep an adequate separation between their primary and secondary jobs, I don't have a problem with moonlighting," he says.

All IS managers agree on one point: If one of their employees is moonlighting, they want to hear about it up front so they can discuss possible conflicts or problems before they occur.

"We would never go so far as to have a blanket policy on moonlighting activities that attempted to cover every situation," Kerwin says.

When Johnson Controls employees are thinking about taking on external work, they are strongly encouraged to first get the approval of their department head or manager, Kerwin says. "In essence, it's between the individual manager and employee to determine what makes sense," he says.

Other managers are even more adamant about employees seeking approval. "In some ways, it could be seen as a betrayal of the company you worked for if you didn't clear it ahead of time," says Frank Vilardi, manager of MIS at Imperial Nurseries in Granby, Conn.

LaPlante is a free-lance writer based in Palo Alto, Calif.

Reality check

Some IS managers feel that if an employee seeks moonlighting opportunities, it can be a sign that something is wrong. Either the salary is not sufficient, the job is not challenging, or the worker is concerned about the firm's financial stability.

"My first question is, 'Do we have a problem? Is there something that I, as manager, should be doing differently?'" says Carleton Technologies' Kenneth Krallman. "I want to keep my people happy."

Personnel consultants say that IS managers shouldn't jump to the conclusion that they are doing something wrong if they discover moonlighting among their employees.

"There are so many factors outside the control of the manager, such as the fact that a spouse just got laid off," Spohn says. "It always pays to do a reality check, however, on how your employees are doing."



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MANAGING YOUR CAREER

David Bourbonnais

How to guarantee you won't get the job



In the course of reviewing thousands of resumes, attending numerous job fairs and conducting various interviews, I have become convinced that information systems professionals must be one of the most benevolent groups in the world. For the most part, you folks

seem absolutely dedicated to helping your job competitors succeed, using every device imaginable to trip yourselves up so that others can move into the positions you want.

If you are committed to the idea of self-sacrifice, here are some of the most dependable plays you can use to make sure you don't make the final cut.

1 Resume/cover letter. This is your first chance to make a poor impression. Make copies of a form letter but write in the name of the person you're sending it to. Add an opening line such

as "After much research, I have decided that [handwrite in the company name] is uniquely suited as the target of my job search." Attach a resume with poor grammar and misspelled words. Fill it with trivia or glittering generalities that describe nothing.

2 Inappropriate personal appearance. Not too many programmers are really locked away in backrooms anymore and allowed no contact with the user community. IS directors are concerned with form as well as substance. They'd like their staffs to

be perceived as part of the business team. Tennis shoes, blue jeans, striped shirts with plaid ties, miniskirts or excessive makeup go a long way to deflect any perception that you are someone who could function well in a business setting.

3 Don't learn anything about the company. This will show your lack of interest and make the company feel you are looking for just another job.

4 Don't articulate what you can do for them. The truly competitive candidate will not let an interview end without expressing how his/her skills and experience can help solve the company's problems — both immediate and long term.

5 Don't know what you're looking for. When asked what you want to do, answers such as "I can do anything" or "What jobs are open?" will generally result in a short interview. This allows more time for those candidates who have some idea of their career goals.

6 Focus on trivial details. IS managers want people who understand the importance of details but do not lose sight of the big picture and the bottom line. Ask, "What kind of terminal will I use?" Fill your resume with things like "I opened a VSAM

file" and "I was voted Ms. Congeniality in my sorority." This theme of trivial highlights can be carried on from resume through interview.

7 Be inflexible. The nature of our society in general and IS in particular is that things will change. The job you interview for today may be different tomorrow. Be sure to indicate what you want, what you expect and what you require. Make no concessions on the type of applications, the platform, methodology, salary, location and benefits. A rigid state of mind will also clue the interviewer that you'll probably be a management problem.

8 Ask what the company can do for you, not what you can do for the company. In other words, forget that you are the seller and the company is the buyer. As soon as possible, ask about salary, benefits, vacation, disability insurance, comm time and your parking space.

9 Don't ask questions, and don't answer any. An interview is a two-way street. Experienced interviewers often evaluate candidates by the significance and depth of questions they ask. Therefore, play it safe and avoid probing questions such as the following: "Why is the position open? What happened to the last person in this position?"

What would you expect me to be able to do coming in the door? What is the career path?"

When you're asked questions, try to respond in monosyllabic words or noises. Dance around the question with a barrage of words and tangential anecdotes — and hope the asker forgot the question.

10 Sell yourself as a computer nerd. Forget that software and hardware are merely tools to solve business problems or enable users to make informed and timely decisions.

I see these techniques used every day. It is not necessary to use all of them, nor are they listed in any order of importance. Two or three will usually suffice. As the benefactors of your efforts get the better positions, you may take solace in the fact that all of your years of education, training and experience have not stood in their way.

Bourbonnais is an independent technical hiring manager in the Dallas-Ft. Worth, Texas area.

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Database (Network) Programmer/Analyst: Design and develop a database system to be run on a client-server based wide area network. Will define and optimize a set of tables and relationship and data elements to contain the client's information. Will run on a Structured Query Language (SQL) server including laying out user screens and reports for data entry and retrieval. Will code, test, and debug system. SQL code will be generated for Microsoft's SQL server, while the screens and reports will be written in Turbo C to run under Windows. Will test, optimize and implement the system for a wide area network that runs across the State of Illinois. Requires M.S. degree in Computer Science. Education to include completion of Master's project in distributed recovery problem solutions. Educational coursework or on-campus employment to include education and problem solving of Novell networking system including using telecommunication software to connect Novell and Kermit to mainframe and personal computers. Education to include coding in C and use of SQL in two courses. Hours: 8:30 a.m. - 5:00 p.m. 37.5 hours per week at \$25.00 per week salary. Must have proof of legal authority to work permanently in the U.S. Please send resume to: Ill. Dept. of Employment Security, 401 S. State St., 3 South, Chicago, IL 60605, ATTN: Martha Carrington, Ref. #V-L 4107C. No Calls, An Employer Paid Ad.

Systems Analyst - Will design, develop, modify, analyze, and implement current computer applications into an Oracle database management information systems environment. Will design and implement procurement management systems using C and embedded SQL under a Windows environment in conjunction with a Unix operating system and Star-Lan operating network. Will design and implement inter-user database applications as well as developing spreadsheets in Lotus 1-2-3. Requires M.S. degree in Computer Science. Also requires one year experience in the job to be performed or will accept one year experience as a Software Specialist; Systems Analyst; or a combination of both if the experience includes the installation, enhancement, and customizing of database applications using embedded SQL in an Oracle DBMS environment in a networking system. Education to include completion of one course in each of the following: Introduction to Data Management System; Operating Systems; Systems Programming; Data Structure & Software Design; Real-Time Software Design; and three courses in Artificial Intelligence. Hours: 7:30 a.m. - 4:00 p.m. 40 hours per week at \$34,580 per year salary. Must have proof of legal authority to work permanently in the U.S. Please send resume to: Ill. Dept. of Employment Security, 401 S. State St., 3 South, Chicago, IL 60605, ATTN: Maxine Courts, Ref. #V-L 4419C, No Calls, An Employer Paid Ad.

Computer Scientist: Specify, design and develop device independent, standard 3-D graphics based modeling software package for proprietary numerical equation solving system and mathematical models for automated manufacturing systems, production planning systems and real-time control of automated workcells utilizing knowledge of, and experience with, designing multi-process operating systems; design of mathematical models for scheduling workflow in automated workcells, 3-D graphic simulations (including layout and shading) for monitoring robotics work processes, user interface management systems, real time control interfaces, ISO PRCS, C and FORTRAN API programming, implementing PHGS kernel and modeling package for OSF-MOTIF, MS-WINDOWS and DOS, finite state graphics machines, C and FORTRAN computer language, and real time interactive environments. \$35,000/yr, 40 hrs/wk, B.S. Must have a Bachelor's degree in Computer Science and 2 yrs exp. Send resume to: Illinois Department of Employment Security, 3134 18th Street, Rockford, IL 61109-2202. Attn: Jim Baldwin, Reference No. 4194-B, AN EMPLOYER PAID AD.

Systems Programmer: 37 1/2 hours per week, 8:00 a.m. to 4:30 p.m.; \$26,900 per year. Design, code and test an interactive experience using ASPECT and telecommunications' problems of implementing an automated station - specific authorization code system; maintain all aspects of two VAX mainframes, including operating systems, utilities, network software and data communications links. Must have an B.S. degree in Computer Science. Must have taken a course in Applied Systems Programming, Local Area Networks, Systems Telecommunications, Database Systems, External Data Structures, Assembly Language. Must have at least six months experience using ASPECT and Supervisory Macros, and NIT Command interpreter. MUST HAVE PROOF OF LEGAL AUTHORITY TO WORK PERMANENTLY IN THE UNITED STATES. Send resume to: Illinois Department of Employment Security, 401 S. State St., #3 South, Chicago, Illinois 60605, Attention: Maxine Courts, Reference No. VIL 4181C. NO CALLS. An Employer Paid Ad.

Programmer/Analyst: Will design, develop and establish a database to be used by a financial publishing company for accounting, finance, marketing and economic analysis. Will create integrated software package capable of allowing various departments to obtain requested information for decision making purposes, including accounts payable and receivable analysis, financial statement analysis, inventory analysis, statistical analysis of marketing information, quantitative analysis of different marketing strategies and forecasting of product sales and source of new customer based on economic forecasting techniques and statistical analysis. All work to be performed in relational database program in MS-DOS using PC assembly language and SPSS under a Novell network environment. Requires M.S. or M.A. degree in Computer Science or Business Economics. Also requires six months experience in the job to be performed or six months experience as a Research Assistant. If experience in related field, entire experience must include analysis of business data by creating a computer model to analyze data using a relational database (Base III or Fox Pro) and SPSS. Education to include completion of courses in: Managerial Accounting; Financial Management Accounting; Marketing Management; two courses in Finance; two courses in Economics; one course in Data Communications; and one course in Operating Systems. Hours: 8:30 a.m. - 5:00 p.m. 40 hours per week at \$27,000 per year salary. Must have proof of legal authority to work permanently in the United States. Please send resume to: Ill. Dept. of Employment Security, 401 S. State St., 3 South, Chicago, IL 60605, ATTN: Joan Sytko, Ref. #V-L 4692-S. No Calls. An employer paid ad.

CIM Systems Engineer - Design and develop Manufacturing Resource Planning (MRP-II) and Computer Integrated Manufacturing (CIM) software systems for the Printed Circuit Board (PCB) industry or the Telecommunications Network Operating System. Consult with company clients to determine needs and customize systems accordingly. Select new software tools and hardware for new products. Testing and debugging of new systems. One college degree in Computer Science required. 2 yrs. in job or 2 yrs. as Systems Analyst required. Experience or education must include writing software in BASIC and C. Must have experience in manufacturing systems for the printed circuit board industry. Experience must include system implementation, maintenance, testing and debugging. One college degree in operating systems design and implementation, computer architecture and computer networks required. Experience may have been obtained before or after degree completion. 40 hrs/wk, 8:30 a.m. to 5:00 p.m., \$28,841/yr. Must have proof of legal authority to work in the U.S. permanently. Send resume and transcript to: ILLINOIS DEPARTMENT OF EMPLOYMENT SECURITY, 401 South State Street-3 South, Chicago, Illinois 60605, ATTN: Ms. Parker, Reference #V-L 4311P. NO CALLS. 2 Copies of Your Resume Required. An Employer Paid Ad.

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For almost 10 years, Devon Consulting has been staffing large data-processing shops in the Philadelphia area with temporary high-tech programming professionals. As President Joel Adams explains, the firm essentially provides programmers, technical writers, and DP specialists like systems programmers, software engineers, and database administrators to companies on a contractual basis as needed. Looking at the specialized computer skills required by their ever-expanding client base, he knows their recruitment message must reach the most qualified audience available. So, like fellow NACCB members who report favorable results, he, too, advertises in *Computerworld*.

"Our clients - banks, insurance firms, pharmaceutical and chemical companies, and software developers - typically require seasoned professionals with unique, hard-to-find skill sets. However, professionals with a minimum of three years' experience in specific technical areas are often few and far between. To fully satisfy our clients' objectives, I need to target an audience with very technical expertise. With its highly qualified readership, *Computerworld* is crucial in helping us make that match.

"As we began to expand outside the immediate area into New Jersey and Delaware, our need to reach a wider technical base grew as well. Unlike our advertisements in Sunday editions of local metropolitan newspapers, our recruitment advertising in *Computerworld* draws qualified candidates not only from New Jersey and New York but also from all around the world. It's by far our single most-effective vehicle for reaching our target audience. Clearly, our recruitment advertisements in *Computerworld* cost less than in other newspapers and produce

higher quality responses. In the past two weeks, for example, nearly 20% of the resumes we received came from *Computerworld* alone.

"In our business, recruitment results like these are key. In 1990 we placed about 135 new starts in addition to the employees we already had in place. This year we expect that number to total 165 or possibly higher. To ensure that Devon Consulting continues placing the right professionals in the right jobs, we fully intend to run an ongoing recruitment advertising schedule in *Computerworld*. When it comes to advertising, we believe that consistency is just as important as the size, message, and vehicle.

"Overall, our *Computerworld* recruitment advertising fulfills a threefold purpose. First and foremost, it's invaluable in recruiting all the top technical talent we need. It also helps us gain share of mind among a highly qualified base of readers. Finally, we know our clients read *Computerworld* and view its advertisers as significant players in the industry. When they read our advertisement, then, they see Devon Consulting as an advertiser in the industry's trade journal. That kind of presence only enhances our company image."

Computerworld. It's where serious employers - like Joel Adams - reach qualified candidates with key computer skills. Every week. Whether you use computers, make computers, or sell computer products and services, *Computerworld* can help you recruit the experienced professionals your business demands. For all the facts, call John Corrigan, Vice-President/Classified Advertising, at 800/343-6474 (in MA, 508/879-0700).

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Positions require at least 4+ years of structured coding experience. Highly desired experience would include COBOL, CICS, DB2, DATACOM, and a background in a structured environment using a formal project life cycle methodology. Excellent communication and leadership skills are essential for these positions. A four-year degree is preferred.

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Position requires 4+ years experience in data administration, database administration, or systems development. At least 1-2 years experience in logical or conceptual data modeling is also required, as well as experience with CASE tools. Excellent interpersonal and communication skills are essential, and JAD facilitation skills are highly desirable. Some task or project management experience is also desirable. A four-year degree is preferred.

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The qualified candidate for this position will possess 2-4 years experience in design, performance & tuning of IMS databases in a large IMS shop. Experience in DB/DC environment is essential, with DB2 experience preferred. Other advantageous skills include a strong knowledge of DL1, Data Dictionary, IMS X-PERT, DBRC, DB TOOLS and IBM JCL.

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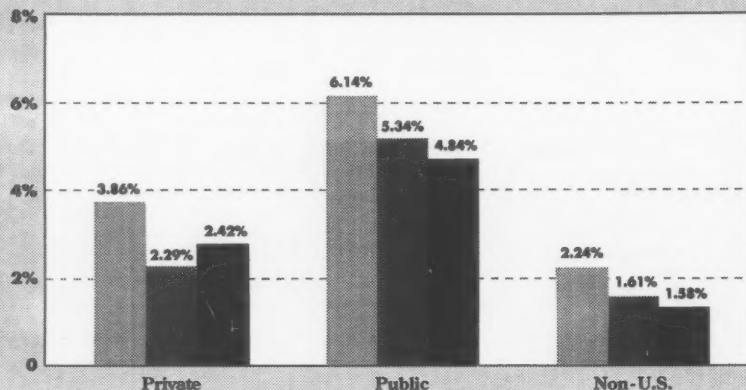
Computerworld/Corptech Career Index

As slight as the gain might seem, the private sector is the only employment bright spot

Percent change in employment count in technology companies by type of ownership

- Change from April 1990 through March 1991
- Change from July 1990 through June 1991
- Change from October 1990 through September 1991

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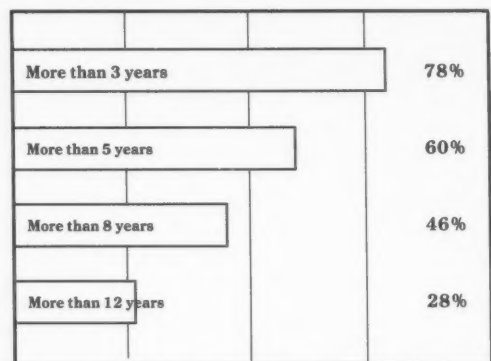
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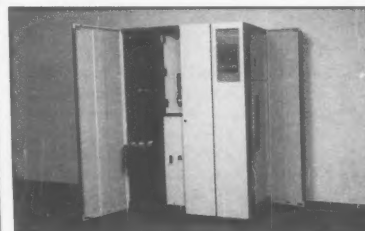
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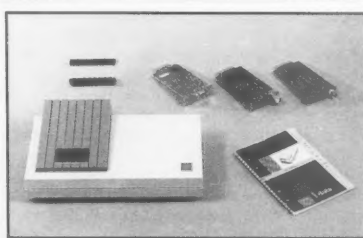


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MARKETPLACE

Pocket modems useful solution for travelers

BY JEREMIAH CARON
SPECIAL TO CW

Portable, or pocket, modems — approximately 3½ by 2½-in. wide, about 1-in. thick and weighing anywhere from as little as 3 ounces to 1 pound — are gaining steam in the marketplace as more users opt to work on the road.

Pocket modems are available from dozens of vendors, most of which are also key standard-size modem vendors. The leading sellers include the Worldport series from U.S. Robotics, Inc. (via its 1991 acquisition of Touchbase Systems, Inc.); Hayes Microcomputer Products, Inc.'s featherweight (3-ounce) Pocket Edition; Microcom, Inc.'s Microporte series; and Practical Peripherals, Inc.'s Practical Pocket Modem 2400.

Second-tier vendors include Vocal Technologies Ltd., Ven-Tel, Inc., CMS Enhancements, Inc. and Best Data. For Apple Computer, Inc. Macintosh Portable users, Ven-Tel offers the Pocket Modem with Fax 24/96S Mac, a 6-ounce product that handles 2,400 bit/sec. data transfers and 9.6K bit/sec. fax communications. A good number of products support both personal computers and Macintoshes.

Pocket modems, though fully functional, lack features such as support for synchronous communications, audio facilities and status indicators. What most pocket modems do offer, however, are cabling (serial and telephone wiring), documentation (an absolute necessity for the road-bound user) and usually some asynchronous communications software, such as Datastorm Technologies, Inc.'s Procomm, Microcom's Carbon Copy or Hayes' Smartcom.

Why go small?

There's no question that the market for pocket modems is full of products equipped for remote communications. However, many users may wonder why and in what cases a pocket modem would be preferable to one of the internal modems now available for most notebook and laptop PCs as vendor options.

One reason that users opt for pocket modems is so they can upgrade their communications capabilities more frequently than their computers, to keep up with the rapid price/performance and standards changes that occur in modem technology, according to Ken Krechmer at Action Consulting in Palo Alto, Calif. When dealing with a large sales staff equipped with laptop systems,

for example, it is often less expensive to provide and then upgrade external pocket modems as needed than to first install and then reinstall the internal modem options available from systems vendors on a wide-scale basis.

Other reasons include the ability to use a single pocket modem with any number of PCs, portables or desktops, along with the special speed and power requirements of cellular communications, according to Barry Gilbert, an analyst at Computer Intelligence/Info-corp in Santa Clara, Calif.

Additionally, pocket modems can act as a solid backup solution to guard against a malfunctioning internal modem.

When selecting a pocket modem, buyers should examine functionality closely because there are considerable differences.

Most products in this class support a pedestrian, though adequate, V.22 or V.22 bis-compatible data transfer rate of 2,400 bit/sec. for remote communications. The cost of these Hayes-compatible pocket modems falls between \$150 and \$200. More expensive (\$400 to \$500) modems are available from a number of vendors that support higher rates, including CCITT V.32 9.6K bit/sec. and higher.

As is the case in most microcomputer product markets, us-

ers can expect prices for these higher speed portable modems to drop to the \$200 range during the next one to two years. One difference between the various pocket modems on the market is the level of error correction provided.

"It is very important that your portable modem meets MNP or CCITT V.42 high-level error correction standards," says Dale Purdy, a U.S. Robotics Worldport user at Micro Systems, a value-added reseller in Columbus,

Ohio. Purdy notes that telephone lines in hotels (common sites for portable communications) can be quirky and that better error-correction facilities may be worth the inherent cost increase.

Portable modems that support the Microcom Networking Protocol (MNP) and/or V.42 can cost \$200 to \$300 more than those that do not, boosting the cost to the \$400 to \$850 range. Only one-third of the products on the market support high-level error correction.

While agreeing that high-level error correction can be important, Gilbert suggests that it may not be worth the difference in price, "especially considering that most communications software packages provide some sort of error correction."

The various pocket modems on the market usually run on ei-

ther 9V batteries, AC connection, a car lighter adapter or any combination of the above. Some run off electricity from the phone line and from the serial port, but these modems cannot be used with some systems, such as the Poqet Computer Corp. PC and Hewlett-Packard Co.'s HPLX palmtops, which do not send power to the serial port. Also, these modems will drain the system's battery further.

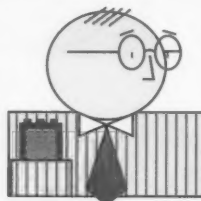
Power outage

AC connection, when available, is the best source of power, Purdy said. "The problem with 9V battery operation is that most portable modems do not run very long on these batteries [one hour or so of connection time]. Your power could easily run out in the middle of a session, and even though you can replace the batteries, that obviously can be a real pain."

The so-called "power" portable PC users, those who spend most of their time on the road, may be interested in the potential of cellular technology, specifically the ability to use a portable modem with a cellular telephone.

Transmission difficulties are still rampant — though improving — in the cellular communications world, so these users will require the more expensive pocket modems that provide high-level error correction and the ability to lower transmission speed.

Caron is the senior group editor for the microcomputer-related services offered by Faulkner Information Services, Inc. in Pennsauken, N.J.



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RFP 2100, due Fri. 1/10/92 at 3:30 p.m. for eight CADD workstations, related peripherals, and software for MERIDIAN COMMUNITY COLLEGE.

RFP 2102, due Fri. 1/10/92 at 3:30 p.m. for ten workstations, related peripherals, and software for a lab at PEARL RIVER COMMUNITY COLLEGE.

RFP 2104, due Tues. 1/7/92 at 3:30 p.m. for 60486 microcomputers, 80886SX microcomputers, printers, miscellaneous peripherals, and software for COPAH-LINCOLN COMMUNITY COLLEGE.

RFP 2120, due Fri. 1/10/92 at 3:30 p.m. for a turnkey, LAN-based system for HINDS COMMUNITY COLLEGE, JACKSON CAMPUS.

RFP 2121, due Wed. 2/19/92 at 3:30 p.m. for consulting services to plan the MISSISSIPPI DEPARTMENT OF HUMAN SERVICES on the AMS Governmental Financial System-based State Automated Accounting System. Vendors are required to attend the bidders' conference on Monday, January 6, 1992 at 9:30 a.m., at the Mississippi Department of Human Services, Executive Office Building, 421 West Pascagoula Street, Jackson, MS 39201.

RFP 2122, due Fri. 1/10/92 at 3:30 p.m. for eight CADD workstations, related peripherals, and software for EAST MISSISSIPPI COMMUNITY COLLEGE.

General RFP No. 2109 due Tues. 1/21/92 at 3:30 p.m. This is a General RFP to be used through January 1993 for dedicated word processing/typing systems for Mississippi governing authorities.

General RFP No. 2110 due Tues. 1/21/92 at 3:30 p.m. This is a General RFP to be used through January 1993 for data processing/telecommunications clerical contract personnel services for the State of Mississippi.

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General RFP No. 2112 due Tues. 1/21/92 at 3:30 p.m. This is a General RFP to be used through January 1993 for PC-level graphics and small CAD systems for the State of Mississippi.

General RFP No. 2113 due Tues. 1/21/92 at 3:30 p.m. This is a General RFP to be used through January 1993 for specialized adaptive equipment and software for microcomputers for the State of Mississippi to be used by visually impaired and physically disabled clients.

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FOCUS ON SOFTWARE

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Bear, Stearns & Co., New York
Dec. 6, 1991

Three themes continue to dominate the software industry: the move to the graphical user interface, networking and object-oriented programming. Firms in these sectors generally qualify as worthy investments right now.

Novell, Inc. and Artisoft, Inc. fit the bill among communications companies. Borland International, Inc. is in the final stages of developing two major Microsoft Corp. Windows applications: Paradox for Windows and Quattro Pro for Windows. While these companies are currently rated buy, their relatively high stock prices — they both hit new 52-week highs recently — call for cautious investing.

Service firms, however, are trading at substantial discounts to the market and offer investors good potential returns over the next year with less risk than the more volatile software stocks.

Sterling Software, Inc., which provides software and diversified services, is undervalued as a result of its low-growth Federal Systems unit and the company's low profile on Wall Street. Federal Systems has become less important to Sterling as its systems software and electronic data interchange (EDI) units pick up speed. This shift, coupled with Sterling's entree into EDI, will raise awareness about the stocks and will likely boost share prices to the mid-\$20 range in the short term (see shorts page 115).

KIM S. NASH

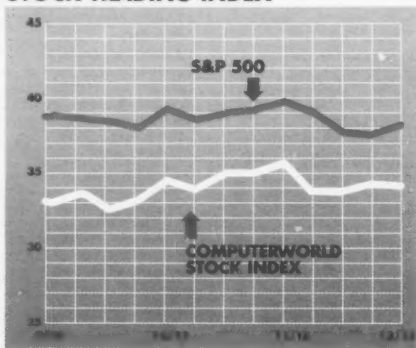
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BMC Software, Inc.	Buy	Mod. attractive
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Cognos, Inc.	Buy	Very attractive
Computer Associates International, Inc.	Neutral	Mod. attractive
Computer Sciences Corp.	Buy	Neutral
Computer Task Group, Inc.	Neutral	Neutral
Easel Corp.	Not rated	Mod. attractive
Goal Systems International, Inc.	Neutral	Mod. attractive
Informix Corp.	Neutral	Neutral
Knowledgeware, Inc.	Not rated	Mod. attractive
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Lotus Development Corp.	Buy	Neutral
Mentor Graphics Corp.	Neutral	Buy
Microsoft Corp.	Strong buy	Mod. attractive
Oracle Corp.	Buy	Buy
Ross Systems, Inc.	Not rated	Very attractive
Software Publishing Corp.	Underperform	Neutral
System Software Associates, Inc.	Buy	Mod. attractive

CW Chart: Michael Siggins

STOCK TRADING INDEX



THIS WEEK'S HIGHLIGHTS

- Novell, Inc. agreed to build a version of Netware that will run natively on Hewlett-Packard Co. workstations. Novell fell 2 points last week to close Thursday at 54 1/2, while HP added 1/4 of a point to 49 1/2.
- IBM slipped 1 1/2 points to 88 1/2. Bear, Stearns & Co. recently downgraded its stock from strong buy to hold. Alex. Brown & Sons, Inc. upgraded Lotus Development Corp. from neutral to buy, saying the company has started to implement the necessary tough cost-control measures. Lotus advanced 2 points to 22 1/2.
- Among the week's losers, Borland International, Inc. dropped 4 1/2 points to 74 1/2.
- Gainers included Advanced Micro Devices, Inc., which reached a new 52-week high Thursday when it closed up 1/4 of a point at 15 1/2. Intel Corp. added 2 1/2 points to 43 1/2. Compaq Computer Corp. picked up 4 points to 27. Network Systems Corp. inched up 1/2 of a notch to 13 last week, after sinking 2 1/2 points the week before.

Computerworld Friday Stock Ticker

CLOSING PRICES FRIDAY, DECEMBER 13, 1991

TOP PERCENT GAINERS			TOP PERCENT LOSERS			Exch 52-Week Range			Dec 13 Wk Net Wk Pct Close Change Change				
TeleVideo Systems	60.26		Information Int'l	-21.21		NYC	15.13	3.38	ASK Computer Sys.	11.25	-0.13	-1.10	
Gandalf Technologies Inc.	30.39		BMC Software Inc.	-19.58		NYC	39.75	25.00	Auto Data Processing	38.88	-1.75	-4.71	
Micrograph	22.32		Tandon Corp.	-16.87		OTC	24.75	28.25	Autodesk Inc.	34.25	2.75	8.73	
Cognos Inc.	18.57		Artel Communication Corp.	-13.33		OTC	35.50	19.75	BGS Systems Inc.	34.50	-0.50	-1.45	
Westek	15.00		Interleaf Inc.	-11.69		OTC	74.75	26.25	BMC Software Inc.	57.50	-14.00	-19.58	
						OTC	18.00	8.75	Books & Babbege Inc.	13.00	0.00	0.00	
						OTC	76.00	25.00	Borland Int'l	76.00	-5.00	-6.47	
						OTC	20.88	7.50	Cognos Inc.	10.38	1.63	18.57	
						NYC	11.13	6.25	Computer Associates	9.00	0.13	1.41	
						OTC	17.75	8.50	Computer Horizons	9.00	0.25	2.86	
						NYS	73.25	46.50	Computer Sciences	65.63	2.00	3.14	
						NYC	11.25	7.00	Computer Task Group	7.25	-0.38	-4.92	
						OTC	22.75	13.00	Comshare Inc.	13.00	-1.00	-7.14	
						OTC	13.25	6.00	Corporate Software	11.00	0.25	2.33	
						NYS	56.88	35.00	General Motors E (EDS)	55.25	2.75	5.24	
						OTC	18.75	9.25	Goal Systems Int'l	9.63	0.00	0.00	
						OTC	7.00	2.06	Hogan Systems Inc.	4.88	-0.50	-9.30	
						OTC	29.25	8.88	Information Resources	24.25	0.13	0.52	
						OTC	15.88	2.63	Informix Corp.	12.00	-0.50	-4.00	
						OTC	3.63	1.06	Intelliplex Inc.	1.31	0.03	2.50	
						OTC	31.50	11.50	Intergraph	17.50	1.00	6.06	
						OTC	18.50	3.00	Interleaf Inc.	8.50	-1.13	-11.69	
						OTC	16.50	6.88	Interleaf Inc.	16.38	0.88	5.85	
						OTC	43.25	10.50	Knowledgeware Inc.	12.75	0.13	0.99	
						OTC	40.75	14.75	Legent Corp.	35.50	-1.50	-4.05	
						OTC	45.00	20.25	Lotus Development	23.63	0.75	3.28	
						OTC	19.00	11.50	Mentor Graphics	14.50	-0.50	-3.33	
						OTC	32.00	9.75	Micrograph	17.13	3.13	22.32	
						OTC	105.25	48.38	Microsoft Corp.	102.00	-2.25	-2.16	
						OTC	16.83	5.50	Oracle Systems	13.00	1.00	8.33	
						OTC	16.25	7.75	Panasonic Systems	16.25	0.00	0.00	
						OTC	10.00	2.38	Petroleum Technology	19.00	0.00	0.00	
						OTC	23.50	9.00	Policy Management Sys.	58.25	-0.38	-0.64	
						OTC	60.75	36.38	Reynolds & Reynolds	32.00	-0.25	-0.78	
						OTC	15.13	5.25	Ross Systems	11.75	-0.25	-2.08	
						OTC	15.00	5.75	SEI Corp.	23.75	0.75	3.28	
						OTC	27.50	17.75	Shared Medical Systems	19.63	0.63	3.29	
						OTC	35.25	12.50	Software Publishing Corp.	13.00	0.25	1.89	
						OTC	19.25	7.13	Sterling Software	18.25	0.25	1.39	
						OTC	18.25	9.88	Sungard Data Sys.	17.00	0.13	1.49	
						OTC	37.50	12.50	Syntex Corp.	37.50	0.13	9.49	
						NYC	13.78	4.50	System Center Inc.	11.00	-1.38	-11.41	
						OTC	37.28	12.50	System Software Assoc.	25.75	0.00	0.00	
Communications and Network Services Up 3.01%			Semiconductors Up 3.77%			Peripherals & Subsystems Up 1.75%			Software & DP Services Up 0.62%				
ATC	12.63	5.50	3COM Corp.	10.25	-0.75	-8.82	NYC	15.75	4.00	Advanced Micro Devices	15.75	0.63	4.13
NYS	68.75	55.75	American Info Techs. Corp.	63.88	1.88	3.02	NYC	12.50	6.50	Analyst Devices Inc.	8.38	0.13	1.52
OTC	40.38	29.00	AT&T	38.13	0.75	2.01	OTC	13.50	6.50	Chips & Technologies	8.38	0.13	1.52
NYS	4.13	0.88	Artel Communication Corp.	1.63	-0.25	-13.33	OTC	29.25	34.75	Intel Corp.	44.25	2.50	5.99
OTC	56.25	43.00	Bell Atlantic Corp.	47.63	2.50	5.54	OTC	12.00	5.38	LSI Logic Corp.	7.38	0.00	0.00
NYS	56.25	43.00	BellSouth Corp.	49.88	3.25	6.97	NYC	19.13	9.00	Micron Technology	13.75	0.75	5.77
NYS	52.88	35.50	Cabletron Systems	46.13	2.63	6.03	NYC	71.25	46.75	Motorola Inc.	60.00	1.63	2.78
OTC	29.25	8.25	Compression Labs Inc.	20.38	-2.13	-8.44	NYC	3.38	3.88	National Semiconductor	6.00	0.50	9.09
OTC	5.13	1.50	Digital Switch Corp.	1.75	0.13	7.69	NYC	47.63	26.75	Texas Instruments	28.00	0.13	0.45
NYS	21.50	11.63	Digital Comm. Assoc.	17.88	0.00	0.00	OTC	12.25	4.13	VLSI Technology	7.25	0.25	3.57
OTC	25.25	14.00	Dynatech Corp.	18.75	1.00	5.63	OTC	4.50	4.50	Western Digital Corp.	2.00	-0.25	-11.11
OTC	12.38	5.00	FileNet Corp.	6.13	-0.25	-3.92	ASE	6.75	2.00	Western Digital Corp.	2.00	-0.25	-11.11
OTC	22.50	6.75	FileNet Corp.	21.88	1.88	9.38							
OTC	3.75	1.13	Gandalf Technologies Inc.	1.88	0.44	30.39							
NYS	3.88	1.88	General Datacomm Inds.	2.88	0.38	15.00							
NYS	34.13	27.50	GTE Corp.	32.50	0.63	1.96							
NYS	63.00	44.88	ITT Corp.	51.63	0.13	0.24							
OTC	61.88	17.88	MDI Communications Corp.	27.75	0.75	2.78							
OTC	14.50	3.25	Microcom Inc.	11.88	-0.50	-4.04							
NYS	15.13	4.00	Network Equipment Tech.	14.00	0.88	6.67							
NYS	15.38	6.25	Network General	14.38	0.53	4.55							
OTC	18.88	10.00	Network Systems Corp.	13.13	0.50	3.96							
NYS	46.25	26.25	Northern Telecom Ltd.	44.38	0.00	0.00							
OTC	58.25	15.25	Novell Inc.	54.50	1.00	1.87							
NYS	79.25	67.00	Novsys Corp.	76.50	2.13	2.86							
NYS	47.00	38.50	Pacific Telesis Group	42.25	1.00	2.42							
OTC	11.63	5.25	Parit Data Comm. Ntwks.	5.88	-0.63	-9.62							
OTC	43.50	10.50	PictureTel Corp.	41.75	2.25	5.70							
NYS	17.88	11.00	Scientific Atlanta Inc.	15.25	0.50	3.38							
NYS	61.25	48.00	Southwestern Bell Corp.	61.00	3.88	6.78							
NYS	31.50	21.25	United Telecom	23.00	1.00	4.55							
NYS	40.75	33.75	US West Inc.	34.88	0.38	1.09							

Unix Labs, Novell tighten ties

BY JIM NASH
CW STAFF

SAN JOSE, Calif. — Novell, Inc. last week formed a joint venture with Unix System Laboratories, Inc. (USL) to more closely tie its Networkware operating system to Unix.

Information systems managers, however, were nonplussed, contending that Unix would be surpassed in popularity on desktop networks by Microsoft Corp.'s Windows NT Technology and IBM's OS/2.

The venture, called Univel, is owned 55% by Novell and is expected in the first half of 1992 to begin distributing a version of Unix System V, Release 4, cus-

tomized to better incorporate Networkware. Novell and USL said the result will be a personal computer-based operating system with far more power than any similar software available.

What's in a name?

The as-yet-unnamed version will be compatible with other System V, Release 4 versions, spokespeople for USL and Novell said. USL will license the software to OEMs, and Novell will distribute it through its massive reseller channel.

Univel will also develop Unix for application servers, noted Kanwal Rekhi, executive vice president and general manager of Novell's Interoperability Sys-

tems Group. Several users, however, questioned Unix's viability beyond the desktop as the operating system of choice in engineering, manufacturing and financial applications.

Mike Ulvestad, senior consultant at Hughes Aircraft Corp. in Long Beach, Calif., said he sees a role for Unix servers. Univel's product, he said, must adhere to standards set by the Open Software Foundation (OSF) in its OSF/1 Unix implementation. It would also need to adopt the OSF's Distributed Computing Environment, a set of rules governing the way all applications on a network should cooperate, regardless of hardware and software differences.

Novell, HP jointly develop native Networkware for HP RISC

BY JIM NASH
CW STAFF

MOUNTAIN VIEW, Calif. — Novell, Inc. and Hewlett-Packard Co. said last week that they will create a version of Novell's Networkware operating system that runs natively on HP's Precision Architecture reduced instruction set computing (RISC) chip. It is slated to be available some time in 1993.

"Native Networkware on RISC is very good news," said Ivar Rachkind, manager of worldwide information resources at Austin, Texas-based Fisher Controls International, Inc. "If they can provide [RISC-based networking] in

an open and standard fashion and be compliant with the Open Software Foundation's Distributed Computing Environment," Rachkind said, the company would be likely to adopt the alliance's products.

The two firms also revealed that Networkware customized for the HP 9000 would be available during the first quarter of 1992. That software would follow Networkware XL for the HP 3000, their only other jointly developed product now available.

Few details accompanied the announcement, which had the look and feel of a technological promissory note. Instead, Novell Chief Executive Officer Ray

Noorda and HP CEO John Young merely said they were formalizing a project-by-project development relationship that has existed for about two years.

Noorda and Young gave loose outlines of the following projects now under way:

- Network-ready HP Vectra servers. Shipping dates are expected to be announced during the first quarter of 1992.
- Greater network management capabilities. Unspecified portions of HP's New Wave desktop management software will be incorporated into Networkware in order to simplify network management. No delivery schedule was announced.
- Network messaging and directory services. The two companies are "investigating" the possibility of co-mingling HP's mail services with Novell's Message Handling System protocol.

Management Protocol, which would allow a Networkware management system to monitor network routers, boards and hubs.

The ability to get advance notification of overused server resources came high on Novell LAN managers' lists — particularly if they could also learn which users and applications were doing the hogging.

"Right now, we have one server that is down to a total of 7M bytes of free disk space, and I'd like to know whose files are taking up all that space," Ackerman said.

Ackerman added that he also liked the idea of a topology map, particularly if it kept track of server location across Consolidated's mixed bag of Arcnet and Ethernet LANs.

Wayne Halterman, regional LAN coordinator for the U.S. Bureau of Reclamation, said it would be great to be able to centrally manage CPU and disk resources across his company's network. "I manage 18 Networkware file servers right now, and it's a real pain," he said.

Networkware to get central view

CONTINUED FROM PAGE 1

shows what a given monitor or server is doing at a given moment, "but not the global picture or the history or the outlook," a Novell spokesman said.

Novell is preparing to remedy this omission by initiating the rollout of a Networkware systems management product that will "emphasize services management" and incorporate "extensive remote management facilities," the spokesman said.

The ability to troubleshoot and manage resources across multiple Networkware servers is a high user priority, said Paul Spresart, vice president of integration support at Computer Support of America, Inc., a Basking Ridge, N.J.-based LAN systems integrator. Right now, users can monitor each Networkware server's performance but not interaction or resource allocation across multiple servers, Spresart added.

Among the features that No-

vell's new system is expected to offer are the following:

- The ability to look at a Networkware network logically, viewing user and applications activity across multiple servers.
- The Network Map Utility, a graphics-oriented, OS/2 Presentation Manager-based user interface that would enable the manager to view a distributed Networkware network as a topological map. The interface would also provide an icon-based interface for invoking network management functions, a Novell spokesman said.
- The ability to set up thresholds that, if passed, would trigger alerts, enabling the network manager to react before a problem becomes serious.
- The ability to monitor and analyze trends in network resource use, such as whether a server's CPU is under- or overused and when a hard disk is almost full.
- Support of Simple Network

NEWS SHORTS

Whistle-blowing goes on-line

"We will bring whistle-blowing into the Computer Age," said Rep. Bob Wise (D-W.Va.) last week, announcing a confidential bulletin board designed to collect information on government waste, fraud and abuse. Whistle-blowers can call (202) 225-5527, sign on with a pseudonym and send messages or documents reporting federal wrongdoing. The system, running 24 hours a day on an IBM Personal Computer XT, will assign a confidential password that the user can use later to retrieve reply messages sent by system operator Wise or his assistant. Information received by Wise's House Government Operations Subcommittee will be used by committee investigators or referred to other investigators.

Twisted sister for FDDI

A draft standard for putting the 100M bit/sec. speeds of Fiber Distributed Data Interface (FDDI) local-area networks on several grades of unshielded twisted-pair wiring should be ready by February, said members of the American National Standards Institute FDDI committee, which met last week in San Diego. Efforts by the committee to offer the high-speed networking option on widely installed copper instead of expensive fiber have to date resulted in shielded twisted-pair products. Product availability for data-grade unshielded twisted-pair is likely by the end of next year.

Sterling expands EDI holdings

Sterling Software, Inc. said it will take over National Systems Corp., a New York-based electronic data interchange (EDI) vendor. The acquisition will fill out Sterling's EDI line, adding software aimed at the financial services industry. The deal is expected to be sealed by Dec. 31.

Simon says Computerland



Computerland Corp. hired former Businessland, Inc. President Edward R. Simon. Before his stint at Businessland, which he ran in its last year, Simon ran Herman Miller, where he once served as chief information officer. Simon was hired at Computerland to serve as executive vice president and president of international operations. His primary responsibilities will be to build the firm's international presence and to work with multinational corporations to better meet their needs.

Galaxy comes into view

Galaxy, the migration environment NCR Corp. demonstrated to customers of its proprietary I series mainframes earlier this year, was introduced as a commercial product last week. A combination of operating software and tools running under Unix System V, Release 4, Galaxy provides a means for I series computers to exchange files with and access applications on NCR's new open systems-, microprocessor-based System 3000 line.

IBM's Escon goes worldwide

IBM and AT&T Paradyne last week announced a partnership to develop extension products to IBM's Enterprise Systems Connection (Escon) architecture that will let users send data across lines from IBM System/370 and System/390 mainframes to peripheral devices, regardless of geographical location and without the need to be attached directly to the mainframe via channel. The first fruits of the collaboration are promised for fourth-quarter 1992 delivery.

LAN Manager 2.1 ships

Microsoft Corp. began shipping LAN Manager Version 2.1 last week. It features connectivity to Novell, Inc. Network and support for IBM Netview and applications compliant with Simple Network Management Protocol. Other LAN Manager products announced included Remote Access Service and services for Apple Computer, Inc.'s Macintosh.

IBM pep talk convinces few

BY NELL MARGOLIS
CW STAFF

NEW YORK — Analysts who attended a half-day meeting with IBM's executive committee early last week generally cheered the firm's attempt at openness and intent to recast itself into a federation of fleet technology boutiques, but they said they see a long spell of confusion ahead as the firm thrashes its way toward its ambitious goals.

"I think many [IBMers and users] are going to find it just overwhelming, and the result will be chaos," said Mary McCaffrey, an analyst at C. J. Lawrence, Morgan Grenfell, Inc. in New York. "I can't say I came

away from the meeting feeling comfortable."

IBM's senior executives attempted to alleviate the inevitable confusion on key concerns, such as the role of a central sales force in the new order and the extent to which IBM will embrace new alliances and the OEM market (see chart at right).

Chairman John Akers emphatically stated that IBM will continue to field a single, unified sales force, deployed by the 60 or so worldwide IBM trading areas, the firm's sales and marketing arm.

The newly created business units will deal with relevant trade areas through arm's-length negotiation with the

trade-area general managers. In effect, each trade-area head will deal with each business unit on a competitive bid basis.

Aimed at soothing users' fears, the single sales force pledge aroused analysts' skepticism. Many query how autonomously a business unit can function if it is wed to a sales force that is in turn tied to IBM central. How can IBM expect the new units to meet aggressive development, production and profit goals without control over how the new products will be sold, industry observers asked.

Several speculated that it cannot and that the single sales force concept will give way to the profit mandate.

On the hot seat

IBM executives candidly explain the company's ongoing restructuring to analysts and emphasize how decentralization will make its sales force and individual business units more aggressive



"You can't say to a sales force, 'Win eight out of 10.' You have to say, 'Win 10 out of 10' — and then leave it to the managers to be realistic in terms of assessment."

John Akers, chairman



"...Our total platforms — software, hardware, whatever we do — we should make available to the OEM opportunity if it makes sense."

Jack Kuehler, president

CW Chart: Marie Haines

Will IBM revamp SAA blueprints?

CONTINUED FROM PAGE 1

will remain much the same because the group already deals with many IBM business units.

There will be no "radical" changes in either SAA or AD/Cycle, Elliott said, but there might be a "refocusing" of Officevision along the lines of more deals such as the one IBM has with Lotus Development Corp. IBM will be reselling Lotus's CC:Mail electronic mail and Notes groupware packages as entry points into Officevision.

Chameleon Officevision

Other observers have suggested that Officevision might take on features that will make it look more like an executive information system or decision-support system than a broadbrush office-automation package.

IBM's large software architectures could shake out in any number of ways. One school of thought — also espoused by IBM — is that the architectures and users will benefit because products will be introduced at a faster rate by a more market-ori-

ented IBM. The contrary view is that the reorganization will simply hasten the departure of the grand software schemes that were already in trouble.

"The more viable architectures and visions [such as SAA] will be more customer-driven than they ever have been, or they will go away," said Paul Hessinger, chief technology officer at Softlab GmbH in Munich, Germany. For example, he said, it would be an opportune time to address the long-standing criticism that AD/Cycle is too mainframe-centric.

Most said they believed SAA to be relatively safe because it is the most generic, and it is the basis on which the others rest. IBM would save money by developing software to a broad set of standards.

Others are not so sure. "The industry can bid a fond farewell to the grand, sweeping, all-encompassing, daddy-will-take-

care-of-you kinds of initiatives," said William Malik, an analyst at Gartner Group, Inc. in Stamford, Conn. He said SAA has metamorphosed into Information Warehouse, changing during the past five years from an architecture that ensures cross-platform applications consistency to a means of providing universal data access across all platforms.

Users in doubt

Users, too, are split over what this means. "Their vision and value system will continue," said Henry Hamilton, senior vice president of IS services at Shearson Lehman Brothers, Inc. in New York. Still, he said, IBM will likely continue working on most projects, even while analyzing

them for longer term revamping. "Some of the initiatives might be backburned — but not for 12 to 24 months. You don't shut these things down in 30 days."

Michael Szejnberg, vice president of technical services at Manufacturers Hanover Trust Co. in New York, said he is "concerned about SAA."

IBM's restructuring will put more stress on the company because it introduces another level of complexity in terms of synchronizing software rollouts. SAA has been difficult enough to implement; this reorganization makes it that much more difficult.

Other users are similarly skeptical. "I've never thought IBM could bring all those architectures together, so I wouldn't mourn their passing," concluded Mark Barmann, chief information officer at Charles Schwab & Co. in San Francisco.



Five easy pieces

IBM last week extended its ongoing reorganization to its Advanced Workstation Division. The business that produces the RISC System/6000 line was broken into five units. It remains under William Filips, an IBM vice president who reports to James Cannavino, IBM vice president and general manager of Personal Systems.

The business units will accelerate decision-making, shorten product cycles and "sharpen our focus on customer requirements," Filips said.

IBM is gearing up to aggressively pursue leading-edge price/performance for the RS/6000 in 1992.

The Advanced Workstation Division comprises the following:

- Personal Workstations — Encompasses new low-end systems that IBM will announce in the next several weeks.
- Advanced Workstations and Servers — Includes current line and mainstream business, focusing on high-performance technical workstation and technical/commercial servers.
- Advanced Systems — Features high-end multiuser systems, such as the RS/6000 Model 900 rack-mounted line.
- Graphics Systems — Includes high-performance, three-dimensional graphics workstations.
- OEM Marketing and Support — Handles OEMs and other third-party business relationships.

MARYFRAN JOHNSON

Delta ponders OS/2 takeoff

CONTINUED FROM PAGE 1

it will help IBM attract other corporate accounts."

King said that while the airline is making a major investment in OS/2, "I am not saying it's the right choice forever."

"Right now, the only thing out there that can do what we need is OS/2 2.0," he said. But the firm will evaluate Microsoft Corp.'s Windows New Technology (NT), a 32-bit environment due to ship next year, King said.

"If it works well, we will keep converting these offices over the

THE ONLY THING out there that can do what we need is OS/2 2.0."

JOHN KING
DELTA AIR LINES

next two years," he said. "If the [traffic management] systems we are installing in airports work well, we will keep doing that. In the meantime, we are looking at Windows NT and Unix."

The airport traffic management software, written in C language, was designed to control airplane traffic near terminal buildings. King said Delta is responsible for getting planes to the runway, after which air traffic controllers take over.

The personal computer-based reservation system will pick up a lot of the processing currently handled by mainframes, which will eventually be charged with coordinating and managing the reservation data.

Senior Correspondent James Daly contributed to this report.

Market-tecture morass

March 1987	IBM unveils SAA, a framework for developing applications across its S/370, S/36, S/38 and PC environments.
April 1987	OS/2 is first SAA product.
May 1989	Officevision unveiled as first SAA application; OS/2 Extended Edition tapped as key desktop environment.
Sept. 1989	IBM introduces AD/Cycle for building SAA-compliant applications.
March 1990	Second release of Officevision delayed amid reports that IBM is struggling to deliver SAA software.
Oct. 1990	IBM says it will maintain a separate but equal development path for Unix that is not part of SAA; acknowledges need for Windows support under SAA.
Sept. 1991	Information Warehouse, a framework for governing access to database data across the enterprise, is unveiled.
Dec. 1991	IBM decentralizes, throws into question fate of SAA and related architectures.

CW Chart: Janell Genovese

Gupta adds features to SQLbase Server

BY JEAN S. BOZMAN
CW STAFF

MENLO PARK, Calif. — Gupta Technologies, Inc. enhanced its SQLbase Server last week, reportedly pushing personal computer local-area network performance beyond 60 transactions per second and partitioning the database so it can be used with disk arrays.

The new version, SQLbase Server 5.0, is scheduled to ship in January for PC-DOS, OS/2 and Novell, Inc. Network servers, and in February for Unix servers. SQLbase 5.0 prices range from \$3,000 to \$10,000, depending on the platform. Versions for five users or less are priced at \$995.

Gupta's delivery of its relational database management system as a Novell Netware Loadable Module (NLM) is among the product's key features. "Gupta is the second RDBMS to do that, after Oracle," said Donald Feinberg, a senior software analyst at Gartner Group, Inc. Users will be able to

set up Gupta SQL databases on various workstations and PCs and knit them into a single Novell work group.

SPX or NLM solutions

One SQLbase 5.0 beta-test site did just that. It connected PCs that were running Oracle Corp.'s NLM into the same network as PCs running the Gupta database. "We're coming to the conclusion that, if you're working in [Netware], you should look for [Novell's] SPX or NLM solutions, rather than creating a multiprotocol scenario," said Doug Goddard, a consultant at the Pickering Nuclear Generating Plant in Pickering, Ontario.

Goddard found that Gupta's NLM software runs about twice as fast as Gupta's 2-year-old SQLbase 4.0 and somewhat faster than the Oracle NLM database.

SQLbase 5.0's partitioned database features will come into play for applications that gather data from IBM mainframes running the DB2 relational database.

BY CHRISTOPHER LINDQUIST
CW STAFF

Windows New Technology (NT) is not here yet. Nor will it be for several months — even in beta-test form. Yet some software vendors and users are already keeping an eye on the horizon for its arrival — sometimes at the expense of OS/2.

Vendors such as Software AG of North America, Inc., NCR Corp. and Micrografix, Inc. have been developing for both Microsoft Corp.'s Windows and IBM's OS/2 environments — all the while paying attention to what the market wants in order to determine where best to spend their research dollars.

Still in development, NT is already undermining rival OS/2. In the case of Software AG and NCR, both companies have recently shifted the primary platform for their applications development from OS/2 to some form of Windows.

"We think we're going to do NT as the ultimate server," said John Gray, assistant vice president in the Cooperative Computer Systems Division at NCR. He added that user interest in NT is

high, even with no product currently available. "The line for NT is larger than the line for OS/2," he said.

Part of the reason for this, Gray said, is Windows' success on the client side of the client/server equation. Links to a server version of NT could only ease development efforts.

Gray also indicated that NCR is currently working on porting NT to multiprocessor Intel Corp. chip-based environments. NCR developers are pleased with the NT code they have seen so far, he added.

It was "purely a market decision," said Mike King, president of Software AG, explaining that demand for Windows products caused the company to refocus its efforts on Windows. He added that could change if the market were to swing OS/2's way.

While both vendors intend to continue support for OS/2, Windows has clearly become the dominant client environment. Even Delta Air Lines, which currently has two major OS/2-based projects under way, plans to evaluate NT.

For now, Dave Evancha, director of research at Workgroup

Technologies, Inc. in Hampton, N.H., said he is not seeing many defections from the OS/2 development camp. He added that recent events at IBM may even help OS/2's position in the market. "I think that with this IBM reorganization they may be able to spin the tide" away from Windows, Evancha said.

'Equal bets'

"In the worst case, developers will place equal bets" on OS/2 and Windows, said J. Paul Grayson, chief executive officer at Micrografix. "I think all developers are going to take what Microsoft says about NT very seriously."

A Microsoft spokesman indicated that more than 100 NT development kits have been shipped to major software vendors. The kits contain the basic code needed to build and test 32-bit Windows NT applications, including an early version of NT. NT beta-test code is scheduled to ship to developers and some users in the first half of next year.

"Once the beta gets out there, you have to commit a buck," Gray said.

Poor prognosis for Unisys/Medicare

CONTINUED FROM PAGE 1

with 140 million claims in 1990.

Bruce Bullen, deputy commissioner for medical services at the Massachusetts Department of Public Welfare, declined to comment on the status of EDS or any other vendor.

"Let's just say we have serious concerns and are exploring our options in terms of a replacement, if we decide to take more drastic action," he said.

The crux of the complaint with Unisys, Bullen continued, was the delay in developing a new on-line claims-processing system to replace a 6-year-old batch system. A key component, an auditing and management reporting subsystem, is partially deployed but behind schedule, a department official noted.

"They are seriously behind," Bullen continued, noting that features of the system are about

a year and a half late.

This is not the first time the department has complained in writing about Unisys' missed delivery schedules, Bullen added.

"LET'S JUST SAY we have serious concerns and are exploring our options in terms of a replacement."

BRUCE BULLEN
MASSACHUSETTS
WELFARE DEPARTMENT

In fact, complaints have gone both ways. Three months ago, Unisys threatened to pull out of the contract because the state, arguing it had not received por-

tions of the system, was late with payments.

Moreover, the state's welfare department has a reputation among vendors as being a difficult and demanding customer.

In a letter dated Nov. 27, the department alleged Unisys failed to deliver promised systems features and did not advise the department of changes in staff on the project. The letter also claimed Unisys failed to notify the department of problems that "jeopardized" the vendor's ability to meet its contractual obligations, such as outages that were fixed before they had a impact on the department's weekly issuing of checks to Medicaid re-

cipients.

A spokesman for McLean, Va.-based Paramax confirmed that the company had received the letter and was addressing the various issues. "At this point, we're optimistic we can address them all," he said, declining to comment further.

Paramax provides Medicare

processing in four states in addition to Massachusetts: New Jersey, Oklahoma, Iowa and Louisiana. Massachusetts is its largest contract, however, and involves some 35 million claims annually.

A decision on whether to terminate the Unisys contract could come in a matter of weeks, according to Bullen.

Ups and downs

In a move that company watchers have anticipated for several months, Unisys last week said it would cease to manufacture low-end personal computers in order to focus its efforts on high-end Intel Corp.-based workstations.

The company will continue to sell mainframe-to-desktop solutions, but low-end systems will now come from OEM sources. "We will continue to evaluate [the option of selling the operation] but see no viable possibilities at this time," said Bernard Brice, vice president of the Unisys Open Systems Group.

Unisys said it would close its manufacturing plant in Flemington, N.J., by June 1992. It currently employs 675 people and will begin a phased closing in March.

The plant closing was part of an overall restructuring plan announced in July. The company said its \$800 million cost-reduction target for 1992 was on schedule.

In separate news, Unisys reported last week the first U.S. shipment of its A19, the high-end A series mainframe it announced in March. Blue Cross/Blue Shield of North Dakota purchased the \$5 million machine, which will replace a Unisys A15KX at the insurer's Fargo, N.D., headquarters this month.

To date, Unisys said, it has booked orders for the A19 totaling more than \$200 million.

ELLIS BOOKER

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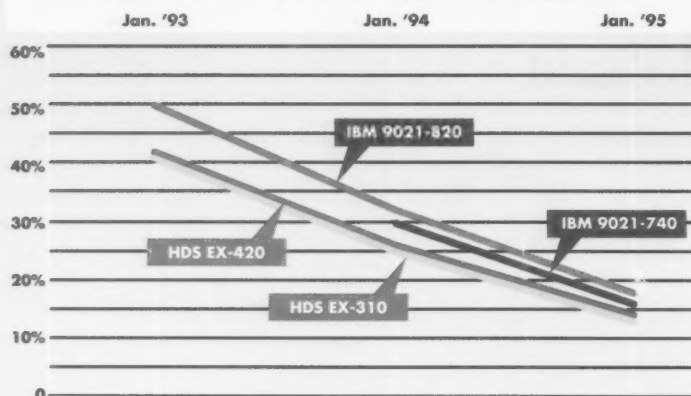
IBM and Hitachi Data Systems mainframe residual values

IBM mainframes maintain a slight edge, holding their value better than HDS' competing systems

Model	Announced	Configured list price	Projected retail residual value		
			Jan. '93	Jan. '94	Jan. '95
IBM 9021-740	9/91	\$11,945,770	New*	\$3,583,731	\$1,911,323
HDS EX-310	6/90	\$11,886,200	\$4,873,342	\$2,971,550	\$1,545,206
IBM 9021-820	9/90	\$16,492,715	\$8,246,358	\$5,277,669	\$2,968,689
HDS EX-420	6/90	\$15,006,000	\$6,302,520	\$3,901,560	\$2,100,840

	IBM 9021-740	HDS EX-310	IBM 9021-820	HDS EX-420
Number of MIPS	121	141.1	167.2	176.4

Projected used retail value as a percentage of list price



* The equipment is being marketed by the manufacturer and/or other distributors as new, at the manufacturer's list price or at a discount to that list price.

Source: Technology Investment Strategies Corp., Framingham, Mass.

CW Chart: Tom Monahan

NEXT WEEK

While many state-of-the-art shops are struggling with downsizing dilemmas, Young & Rubicam is painlessly implementing new technology across the board — with a goal of 10,000 inter-networked workstations worldwide by 1995. Meet Y&R's Senior Vice President and CIO Nicholas Rudd in next week's Manager's Journal.



Charles Edinger

The coming year will bring unprecedented challenges to IS managers and the computer industry. In our special Forecast 1992 double issue, you'll get a taste of what business trends will shape your daily life; whether vendor partnerships mean more hype or a real buyer's advantage; what's coming on the technology horizon; and much more.

INSIDE LINES

Singing the Moody blues

► The likes of IBM finance executive Frank Metz's up-front admission that 1991 revenue will prove "a series of disappointments, with few bright spots," IBM President Jack Kuehler's concession that PC revenue will plummet 10% for the year, and IBM Chairman John Akers' admission that 1992 gross margins are unlikely to exceed 53% sent analysts away from an IBM conference last week with their machetes aimed at IBM stock estimates... And as IBM stock plummeted to a several-decade low, Moody's Investor Services slapped a "review" sticker on IBM's triple-A rating. However, said one Moody's credit analyst, only reluctantly and only on a technicality: The current "lack of predictability" of IBM's stock, he said, forced Moody's hand. IBM is the only pure technology company to bear Moody's blue-ribbon rating.

Cleaning Windows for networks

► Microsoft is reportedly preparing to strike at Novell and Banyan by incorporating peer-to-peer networking in Windows. Microsoft networking chief Mike Murray told "Windows Watcher" publisher Jesse Berst that Microsoft is working on it. The product, reportedly dubbed Windows 3.1+, would allow small work groups of Windows workstations to share files and printers and exchange mail without the expense and bother of setting up a server. Expected introduction date is June.

Flopping out

► Apple's newly introduced Powerbook 140 and 170 laptops are already experiencing sporadic problems with their floppy drives, according to several annoyed users. Symptoms include the inability to initialize floppies, problems copying files to the hard disk and difficulty reading 800K-byte disks. The problems are covered by the product's one-year warranty.

When RISC pays off

► Promising new products or enhancements every six to nine months for the RISC System/6000 in 1992, IBM is gearing up for an aggressive pursuit of leading-edge price/performance in the Unix market. In recent briefings with Wall Street analysts, IBM execs said the RS/6000's \$1 billion revenue in 1990 grew by 50% to 75% in 1991 to an estimated \$1.5 billion or more. Another 50% growth — to about \$2 billion in revenue — is expected by the end of '92. By then, the RS/6000 should actually be turning a profit for IBM, analysts projected.

Network management sighted

► We've got it straight from the horse's mouth that Sprint's long-delayed Insight II network management system will debut sometime in January (Comnet looks like a good bet). The new system is expected to finally extend beyond Sprint's Virtual Private Network service to its T1 and fractional T1 services and provide users with more flexible and powerful configuration and monitoring capabilities. Sprint will still maintain a separate management system for its packet and fast-packet offerings, we are told.

Let the plastic surgery begin!

► Compaq picked image doctors Ammirati & Puris, Inc. to reshape its North American advertising, a definite Compaq weakness. Ammirati replaces Ogilvy & Mather and faces the task of creating a "market revolution" for the restructuring Compaq, which some view as an attempt at cosmetic surgery.

Here's a tickler from the piracy cops: The December issue of the Software Publisher's Association's newsletter contains a tale about Piracy and Divorce Court. It seems the SPA received a call from a man who claimed that the judge in his divorce trial had told him to make copies of software for his ex-wife. (The property division left the husband with the "original" software, while his wife got the Macintosh.) No doubt knowing how much the SPA frowns on illegal copying, the man asked the SPA to step in and "correct the misguided judge." It was happy to oblige. End result? The judge modified his order, all right — he told the husband to hand over the "original" software to his ex. Our News Editor Alan Alper hopes never to find himself in that situation. Keep him busy with news tips. Phone him at (800) 343-6474, fax him at (508) 875-8931, or Compuserve him at 76537,2413.

THIS TERMINAL IS NO DUMMY.



There's nothing wrong with a dumb terminal. Unless you could use something with a bit more intelligence.

Like the Harris Adacom Multi-Window Display Station.

It lets you work with multiple 3270 sessions simultaneously. Up to 16 sessions, in fact. It also lets you work with multiple hosts simultaneously. In other words, it lets you work the way most people do – on several things at once.

And it makes that work much more efficient. The graphical user interface and mouse support allow you to jump between sessions, cut and paste, and resize or move windows at your discretion. And the high-resolution monitor keeps the images on screen crystal clear.

It's almost like having a PC. Only far more economical. And secure.

If you have to deal with several applications at once, this is one smart terminal. For more information, call 214-386-2000.

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DASD Management System used to compress
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<i>Elapsed Time</i>	<i>CPU Time</i>	<i>EXCPs</i>	<i>Job Cost</i>
157 Min-32 Sec.	67 Min-41 Sec.	183,492	\$843.51

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1992 Computerworld Editorial Calendar (January-June)

Issue Date	Ad Closings Color* B/W		Editorial Feature	Show Distribution	Ad Readership Issue	Response Card Decks
Jan. 6	Dec. 20	Dec. 27	Executive Report: To Be Announced			
Jan. 13	Dec. 27	Jan. 3	Product Spotlight: Windows Applications			Mails: Jan. 15 Space Close: Dec. 6 Mat'l Close: Dec. 9
Jan. 20	Jan. 3	Jan. 10	Executive Report: To Be Announced Industry Closeup: Automotive Industry			
Jan. 27	Jan. 10	Jan. 17	Product Spotlight/Buyers' Scorecard: LAN Management	Communication Networks Jan. 28-30 Washington, D.C. Windows OS/2 Jan. 28-30, San Jose, CA	Harvey Study	
Feb. 3	Jan. 17	Jan. 24	Executive Report: To Be Announced			
Feb. 10	Jan. 24	Jan. 31	Product Spotlight: E-Mail	Networld Feb. 11-13, Boston	Starch Study	Mails: Feb. 12 Space Close: Jan. 3 Mat'l Close: Jan. 6
Feb. 17	Jan. 31	Feb. 7	Executive Report: To Be Announced			
Feb. 24	Feb. 7	Feb. 14	Product Spotlight/Buyers' Scorecard: Accounting Systems			
Mar. 2	Feb. 14	Feb. 21	Executive Report: To Be Announced			
Mar. 9	Feb. 21	Feb. 28	Product Spotlight: Client/Server Application Development		Starch Study	Mails: Mar. 11 Space Close: Jan. 31 Mat'l Close: Feb. 3
Mar. 16	Feb. 28	Mar. 6	Integration Strategies: Pulling Macs Into the Enterprise Network Industry Closeup: Aerospace			
Mar. 23	Mar. 6	Mar. 13	Product Spotlight/Buyers' Scorecard: RISC Desktop Machines and Servers	DB Expo Mar. 23-26 San Francisco	Starch Study	
Mar. 30	Mar. 13	Mar. 20	Executive Report: To Be Announced			
Apr. 6	Mar. 20	Mar. 27	Product Spotlight/Buyers' Scorecard: PC Software—Fresh Application Categories and New Twists on Old Ones	Comdex Spring '92 and Windows World Apr. 6-9, Chicago		
Apr. 13	Mar. 27	Apr. 3	Executive Report: To Be Announced			Mails: Apr. 15 Space Close: Apr. 3 Mat'l Close: Apr. 6
Apr. 20	Apr. 3	Apr. 10	Product Spotlight: Printers Best Suited for a LAN Environment			
Apr. 27	Apr. 10	Apr. 17	Executive Report: To Be Announced		Starch Study	
May 4	Apr. 17	Apr. 24	Product Spotlight: Midrange Systems That Run Enterprises			
May 11	Apr. 24	May 1	Integration Strategies: Creating an "Open" Company Industry Closeup: Personal Care Industry		Starch Study	Mails: May 13 Space Close: Apr. 3 Mat'l Close: Apr. 6
May 18	May 1	May 8	Product Spotlight/Buyers' Scorecard: Routers	Interop East May 18-22 Washington, D.C.		
May 25	May 8	May 15	Executive Report: To Be Announced			
June 1	May 15	May 22	Product Spotlight: What the Well-Equipped Help Desk is Using			
June 8	May 22	May 29	Product Spotlight: MRP II			Mails: June 10 Space Close: May 1 Mat'l Close: May 4
June 15	May 29	June 5	Special Edition: Annual Premier 100 Magazine (Ad Close: May 1) Executive Report: To Be Announced			
June 22	June 5	June 12	SPECIAL SUPPLEMENT: Computerworld's 25th Anniversary Product Spotlight/Buyers' Scorecard: Portable Computing (laptops, notebooks, pen-based and wireless technologies)	PC Expo June 23-25 New York City AIM June 22-25 Anaheim	Starch Study	
June 29	June 12	June 19	Executive Report: To Be Announced			

* Includes ads placed within Executive Report or Product Spotlight sections and premium positions.

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A CHALLENGE TO COMPUTERWORLD READERS:

THE NATIONAL CENTER FOR MISSING AND EXPLOITED CHILDREN NEEDS OUR HELP

COMPUTERWORLD

Gary Beach
Publisher

375 Cochituate Road
Framingham, MA 01701-9171
508-879-0700



At Comdex Fall, I met Ernie Allen, President of the National Center for Missing and Exploited Children.

Ernie's mission is quite simple: to marshal all the resources he can to help reunite the thousands of missing children in the United States with their families.

One of the National Center's most urgent needs is computer and network equipment. Equipment that will facilitate the sharing of information about these missing children among federal, state and local authorities.

Ernie's dedication to this cause — and the leadership of Paul Grayson, president, Micrografx, Inc., in donating proceeds from the Third Annual Chili Cook-Off to the National Center — inspired me to share the "cause" with the 600,000 readers of *Computerworld* via this note.

On the next page is a personal letter to each *Computerworld* reader from Ernie Allen, a list of the equipment the National Center needs and how to get in touch with the National Center for Missing and Exploited Children.

If the collective efforts of the *Computerworld* community results in the National Center receiving equipment that will reunite just one family, it will all be worth it.

I urge every *Computerworld* reader to turn the page — then pick up the phone and call the National Center to make your donation.

Cordially,

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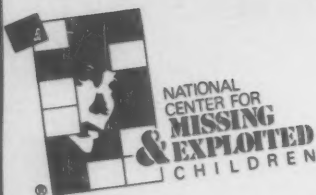
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SECOND CLASS

A CHALLENGE TO COMPUTERWORLD READERS: PUTTING TECHNOLOGY TO GOOD USE

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On behalf of the National Center for Missing and Exploited Children, I extend heartfelt thanks to *Computerworld* in putting forth a call to action for the I/S community. Information Systems professionals devote their energy and expertise to implementing information technology needed by their companies. The needs of our organization are just as great.

We are seeking to build a national technology network, linking the Center with state and local missing children organizations, and leading forensic artists. This network will allow us to transmit images and information quickly and effectively.

Your support will help us launch an aggressive, unified, national campaign to locate missing children and protect thousands of other children from victimization. Through technology, we have created an imaging laboratory that age progresses the photos of long-term missing children, and have already recovered nine of them. But with 9,000 active cases, including 4,200 children missing for more than two years, we need your help.

We are proud to join with *Computerworld* and I/S professionals in this effort to find technology solutions for one of America's most difficult and pressing problems. Your support will truly make a difference for children and families across America.



Sincerely,

Ernest E. Allen

Ernest E. Allen
President



BRANCHES: ADAM WALSH CHILD RESOURCE CENTERS in Southern California, South Florida, Upstate New York, and South Carolina

COMPUTER EQUIPMENT MOST NEEDED BY THE NATIONAL CENTER FOR MISSING AND EXPLOITED CHILDREN

- 20 Notebook Computers
(286 and/or 386, with modems)
- 2 File Servers
(486, 33MHz with 8MB RAM)
- 300 Hard disks
(600 MB, ISA or EISA Architecture)
- 100 Desktop PCs
(386/SX or DX, 20MHz, 2MB RAM,
80MB Hard Disk, ISA Architecture)
386/SX or DX, 20MHz, 4MB RAM,
80MB Hard Disk, ISA or MCA
Architecture, DOS or OS/2)
- 2 Novell NetWare 3.11
- 5 Tape Backup Systems
- 50 9600 Baud Modems
- 50 Laser Printers
(Hewlett-Packard or
compatible, 2MB RAM)
- 50 CD-ROM Players and
Interface Cards
- 50 FAX Machines (Group III)

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